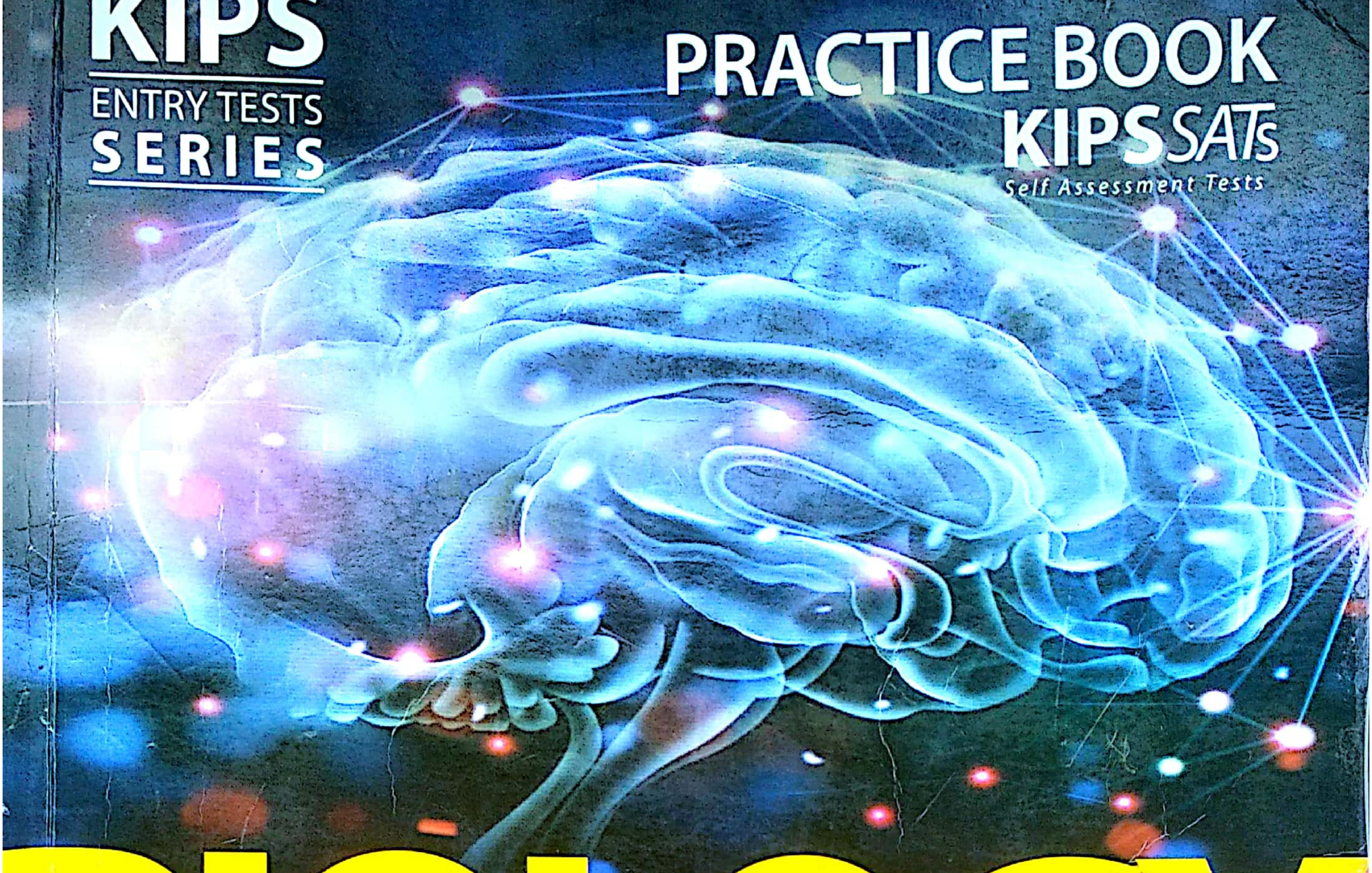
KIPS
ENTRY TESTS
SERIES

PRACTICE BOOK
KIPS SATs
Self Assessment Tests



BIOLOGY

National MDCAT

AS PER PMC SYLLABUS

- 1942 Practice MCQs
- Questions from Past Papers
- Answer Keys with Explanatory Notes
- Topic-wise Practice Exercises
- Unit-wise Self Assessment Tests
- Pre-Prep Test (Diagnostic Test)
- Post-Prep Test
  (Sample Paper as per Original Format)

A Kitab Dost Publication

KIPS
ENTRY TESTS
SERIES

Taimoor

PRACTICE BOOK

BIOLOGY

NATIONAL MDCAT

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KIPS *SATs* UNIT WISE

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- **This Pre-Prep Test is designed to help you to pinpoint the weak areas in your background. Sit aside 1 hour to take this test. Check your answers with those at the end of the test. Then evaluate yourself.**

PRE-PREP TEST »

Q.1 Cellular digestion is associated with which organelle:
A. Mitochondria
B. Plastids
C. Golgi bodies
[✓ D. Lysosomes]

Q.2 Which of the following cell have no mitochondria?
A. Viruses
[✓ B. RBCs]
C. Nerve cells
D. Muscle cell

Q.3 Membranes of the grana are sites where:
A. Oxygen is stored.
[✓ B. Sunlight is trapped]
C. Food is stored
D. CO_2 is stored

Q.4 Name a self-replicating organelle:
[✓ A. Mitochondria]
B. Peroxisomes
C. Phagosomes
D. Golgi bodies

Q.5 These are most abundant components of a cell membrane:
A. Lipids
B. Carbohydrates
[✓ C. Protein]
D. Glycolipids

Q.6 Which of these is incorrect about prokaryotes?
[✓ A. No organelles present]
B. Cell wall present
C. Nucleus absent
D. Chromatin present

Q.7 Variety among amino acids is produced due to:
A. NH_2 group
[✓ B. R group]
C. COOH group
D. Functional group

Q.8 Primary structure of proteins is determined by:
A. Number of polypeptide chains involved
[✓ B. Amino acid sequence]
C. Bending of polypeptide chains
D. Coiling of polypeptide chains

Q.9 The one which is not a globular protein:
A. Anti Rh-antibody
[✓ B. Myosin tail]
C. Enzyme
D. Haemoglobin

Q.10 Total number of peptide linkages in haemoglobin molecule is:
A. 574
B. 573
[✓ C. 570]
D. 10,000

Q.11 Hydrolysis of which of the following would yield fructose in addition to glucose?
[✓ A. Sucrose]
B. Lactose
C. Maltose
D. Cellulose

Q.12 Ionization of active sites and substrates are affected by:
A. Slight change in temperature
B. Extreme change in temperature
[✓ C. Slight change in pH]
D. Extreme change in pH

Q.13 For enzymes cyanides act as:
A. Substrates
B. Cofactors
C. Prosthetic groups
[✓ D. Inhibitors]

Q.14 An enzyme which converts a dipeptide into individual amino acids is an example of:
A. Decarboxylase
B. Oxidoreductase
[✓ C. Hydrolase] — Trypsin
D. Transferase

Q.15 The one which is incorrect pair:

A. R.E.R – protein formation

[✓ B.] Chloroplast – Krebs cycle

C. Nucleus – DNA

D. Cytoplasm – Glycolysis

Q.16 Which of the following is the molecular formula of chlorophyll 'b'?

A. $C_{55}H_{70}O_5N_4Mg$

[✓ B.] $C_{55}H_{70}O_6N_4Mg$

C. $C_{55}H_{72}O_6N_4Mg$

D. $C_{55}H_{72}O_5N_4Mg$

Q.17 How many moles of carbon dioxide are produced by complete oxidation of one mole of pyruvic acid?

A. 1

[✓ B.] 3

C. 2

D. 6

Q.18 Which of the following does occur in anaerobic respiration but not in aerobic respiration?

A. Release of CO_2

B. Formation of ATP

C. Reduction of NAD^+

[✓ D.] Production of ethanol from acetaldehyde

Q.19 Net production of ATP during glycolysis is:

[✓ A.] 2 ATP

B. 36 ATP

C. 4 ATP

D. 38 ATP

Q.20 End product of preparatory phase of glycolysis is:

A. Glucose

B. ATP

C. Pyruvate

[✓ D.] G3P

Q.21 Protein coats of viruses are synthesized in:

[✓ A.] Lytic cycle

B. Temperate cycle

C. Lysogenic cycle

D. Nucleus

Q.22 Host biosynthetic machinery forms all components of phages under phage genomic information except:

A. DNAs

[✓ B.] Envelope of phages

C. Tail proteins

D. Capsid proteins

Q.23 Mode of reproduction in viruses is:

A. Conjugation

B. Binary fission

[✓ C.] Replication

D. Transformation

Q.24 Which of these is incorrect about HIV?

A. Envelope is lipoprotein in nature

B. Cone shaped capsid

[✓ C.] Contains one molecule of RNA

D. Two molecules of reverse transcriptase

Q.25 *Enterobius vermicularis* is usually not associated with:

A. Inflammation of appendix

B. Inflammation of colon

C. Itching of anus

[✓ D.] Blood clotting

Q.26 Pick out different considering habitat:

[✓ A.] Liver fluke

B. Hook worm

C. Pin worm

D. *Ascaris*

Q.27 Common housefly may be a cause of:

A. Polio

[✓ B.] Hepatitis

C. Tuberculosis

D. Malaria

Q.28 Which one of the following is not an example of endoparasite?

[✓ A.] Leech

B. Hook worm

C. Liver fluke

D. Pin worm

Q.29 There are ________ principle sites of digestion in digestive system of man:

A. 2

B. 4

[✓ C.] 3

D. 5

Q.30 Oral cavity is bounded by all except:
A. Cheeks
B. Palate
C. Teeth
[✓ D. Salivary glands]

Q.31 Pyloric sphincter is present between stomach and:
A. Esophagus
B. Colon
[✓ C. Duodenum]
D. Ileum

Q.32 Inner most layer of stomach is called:
A. Elastic layer
[✓ B. Mucosa]
C. Muscular layer
D. Sub mucosa

Q.33 Which of the following are triploblastic and acoelomate?
A. Sponges
[✓ B. Platyhelminthes] – flatworm.
C. Annelida
D. Aschelminthes

Q.34 Plants which are insectivorous needs insects to feed on because it need:
A. Water
[✓ B. Nutrients]
C. Air
D. Oxygen

Q.35 *Drosera intermedia* is generally known as:
[✓ A. Sun dew]
B. Pitcher plant – Sarracenia Purpurea.
C. Morels
D. Venus fly trap – Dioneaa Muscipula.

Q.36 The beating sound your heart makes comes from:
A. Blood going in wrong direction
[✓ B. Valves closing]
C. The heart skipping beat
D. Transmission of electrical impulse

Q.37 Which of these makes third line of defense?
A. Neutrophils
B. Macrophages
C. Skin
[✓ D. Lymphocytes]

Q.38 Antibodies consist of:
A. One chain
B. Two chains
C. Three chains
[✓ D. Four chains]

Q.39 Senile RBCs break down occur mainly in:
A. Bone marrow
B. Liver
C. Lymph nodes
[✓ D. Spleen]

Q.40 The major constituent of blood plasma is:
A. Protein
[✓ B. Water]
C. NaCl
D. Organic molecules

Q.41 All of the following veins carry deoxygenated blood except:
A. Superior vena cava
B. Hepatic vein
C. Inferior vena cava
[✓ D. Pulmonary vein]

Q.42 Antibodies are produced by:
A. B-lymphocytes
B. Helper T lymphocytes
C. T lymphocytes
[✓ D. Plasma clone cells]

Q.43 Total number of bones in human skeleton are:
A. 200
B. 300
[✓ C. 206]
D. 350

Q.44 Joint present between proximal end of radius and ulna with humerus is:
A. Pivot
[✓ B. Hinge joint]
C. Ball and socket joint
D. Synovial joint

Q.45 Site for attachment of calcium ions is present on:
A. Actin
B. Myosin
[✓ C. Troponin]
D. Tropomyosin

Q.46 Elastin is a protein that can be found in:

A. Bones
[✓ B. Ligaments]
C. Tendons
D. Capillaries

Q.47 The cells present in testes and secrete testosterone are:

A. Sertoli cells
[✓ B. Interstitial cells]
C. Germinal cell
D. Spermatocyte

Q.48 The one which causes contraction of wall of the uterus during and after birth:

A. ADH
[✓ B. Oxytocin]
C. MSH
D. Progesterone

Q.49 Spiny look of neurons is due to their:

A. Myelin sheath
B. Axon
C. Dendron
[✓ D. Dendrites]

Q.50 All of the following are important functions of neuroglia in CNS except:

A. Protection of neurons
B. Speed up impulse conduction
[✓ C. Neuronal division]
D. Nutrition of neurons

Q.51 It is true about all hormones:

[✓ A. Organic substances]
B. Protein substances
C. Inorganic substances
D. Lipid substances

Q.52 Which hormone increases blood calcium level?

A. Calcitonin
[✓ B. Parathormone]
C. Cortisol
D. Thyroxin

Q.53 Uterus gains maximum thickness during:

[✓ A. Secretory phase]
B. Proliferative phase
C. Menstrual phase
D. Ovulatory phase

Q.54 Oogenesis in human female starts:

A. At puberty
B. Before puberty
[✓ C. Before birth]
D. After puberty

Q.55 Placenta is involved in

[✓ A. Stimulation of milk production]
B. Stimulation of birth
C. Stimulation of egg release
D. Development of secondary sex characters

Q.56 Haemophilia can be result of:

A. Reduction of blood clotting factors
B. Malfunctioning of blood clotting factors
C. Complete absence of blood clotting factors
[✓ D. All A, B, C]

Q.57 Multiple alleles are the alleles that are always:

A. More than 1
B. More than 3
[✓ C. More than 2]
D. More than 4

Q.58 Albinism is a________ trait:

A. Autosomal dominant
B. Sex-linked dominant
[✓ C. Autosomal recessive]
D. Sex-linked recessive

Q.59 Which of the following traits pass in zig zag fashion from parents to offsprings?

[✓ A. X-linked traits]
B. Y-linked traits
C. Sex influenced traits
D. Sex limited traits

Q.60 Which of the following blood group in humans is an example of co-dominance?

A. A
B. B
[✓ C. AB]
D. O

Q.61 Which of the following is a physical relation between genes?
A. Dominance
B. Gene linkage
C. Epistasis
D. Pleiotropy

Q.62 Gene for all of the followings linked with autosomal chromosomes except:
A. Sickle cell anemia
B. Gout
C. Leukemia
D. Hemophilia C

Q.63 Which statement correctly describes the transcription of DNA?
A. It produces another DNA molecule
B. It is a semi conservation process
C. It produces mRNA
D. It occurs at surface of ribosomes

Q.64 The process that has transformed life on earth from its earliest forms to vast diversity is:
A. Mutation
B. Evolution
C. Migration
D. Genetic drift

Q.65 The one which is present in all aerobic species:
A. Cytochrome a
B. Cytochrome a_3
C. Cytochrome c
D. Cytochrome b

Q.66 The structure which has been formed or modified from gill pouches in humans is:
A. Gills
B. Middle ear
C. Eustachian tube
D. Lungs

Q.67 All of the followings are conjugated molecules except:
A. Phospholipid
B. Glycoproteins
C. Glycolipids
D. Nucleohistone

Q.68 Total number of salivary glands present in human oral cavity are:
A. 3
B. 4
C. 6
D. 8

ANSWER KEY

1	D	11	A	21	A	31	C	41	D	51	A	61	B
2	B	12	C	22	B	32	B	42	D	52	B	62	B
3	B	13	D	23	C	33	B	43	C	53	A	63	C
4	A	14	C	24	C	34	B	44	B	54	C	64	B
5	C	15	B	25	D	35	A	45	C	55	A	65	C
6	A	16	B	26	A	36	B	46	B	56	D	66	C
7	B	17	B	27	B	37	D	47	B	57	C	67	A
8	B	18	D	28	A	38	D	48	B	58	C	68	C
9	B	19	A	29	C	39	D	49	D	59	A		
10	C	20	D	30	D	40	B	50	C	60	C		

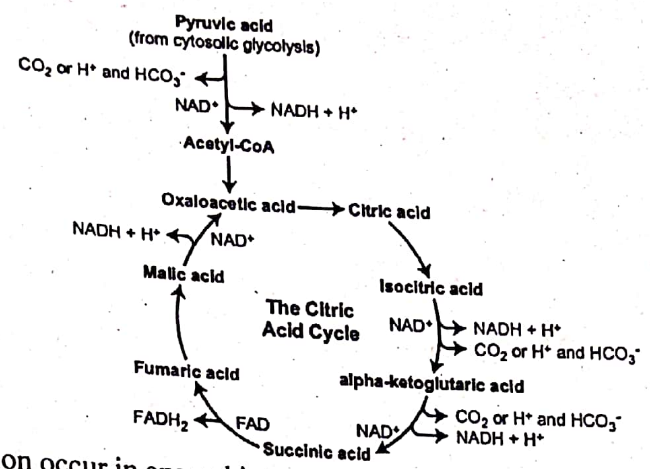
EXPLANATORY NOTES»

1. Lysosomes are sac like organelles that have digestive enzymes in it. Mitochondria involve in aerobic respiration. Golgi bodies involve in packing, processing, modification and transport of materials. Plastids are plants organelles that are involve in synthesis of sugar, pollination and storage of organic materials.
2. RBCs have no mitochondria.
3. Grana of chloroplast have photosynthetic pigments arranged in the form of cluster called photosystem, which involve in light dependent reaction.
4. Mitochondria and chloroplast are self-replicating organelles because both have their own DNA, due to which they can synthesize some of its proteins.
5. Following are abundent components in the cell membrane
   - Proteins are 60-80%
   - Lipids are 20-40%
   - Carbohydrates are in traces
6. Prokaryotes have ribosomes which are non-membranous organelle.
7. Each of the 20 amino acids has a specific side chain, known as an R group, that is also attached to the α carbon. The R groups have a variety of shapes, sizes, charges, and reactivities. This allows amino acids to be grouped according to the chemical properties of their side chains.
8. The linear sequence of amino acids within a protein is considered the primary structure of the protein. Proteins are built from a set of only twenty amino acids, each of which has a unique side chain. The side chains of amino acids have different chemistries. The largest group of amino acids have nonpolar side chains.
9. Antibodies, enzymes and haemoglobin are globular proteins.
10. A hemoglobin molecule is made up of four polypeptide chains, two alpha chains of 141 amino acid residues each and two beta chains of 146 amino acid residues each.
11. Hydrolysis of;
    - Lactose gives galactose and glucose.
    - Maltose gives two glucose monomers.
    - Cellulose gives glucose monomers.
12. Due slight change in pH ionization of amino acids of active site of enzyme occur, while extreme change in pH cause denaturation of enzyme.
13. Inhibitors are the substances that block enzyme action temporarily or permanently. Prosthetic group is a type of cofactor.
14. Decarboxylases, are carbon–carbon lyases that add or remove a carboxyl group from organic compounds.

    Oxidoreductase is an enzyme that catalyzes the transfer of electrons from one molecule. Transferase is an enzyme which catalyses the transfer of a particular group from one molecule to another.
15. Krebs cycle occur in mitochondrial matrix.
16.

Chlorophyll a	Chlorophyll b
$C_{55}H_{72}O_5N_4Mg$	$C_{55}H_{70}O_6N_4Mg$

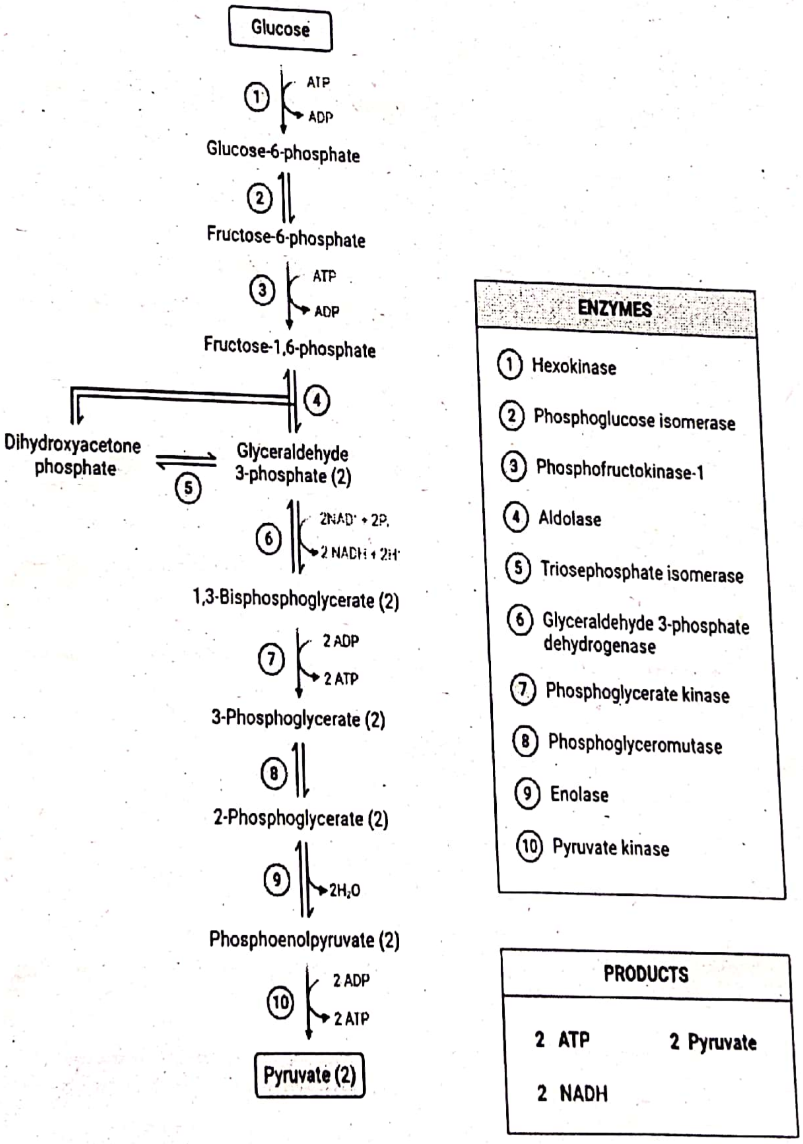
17.



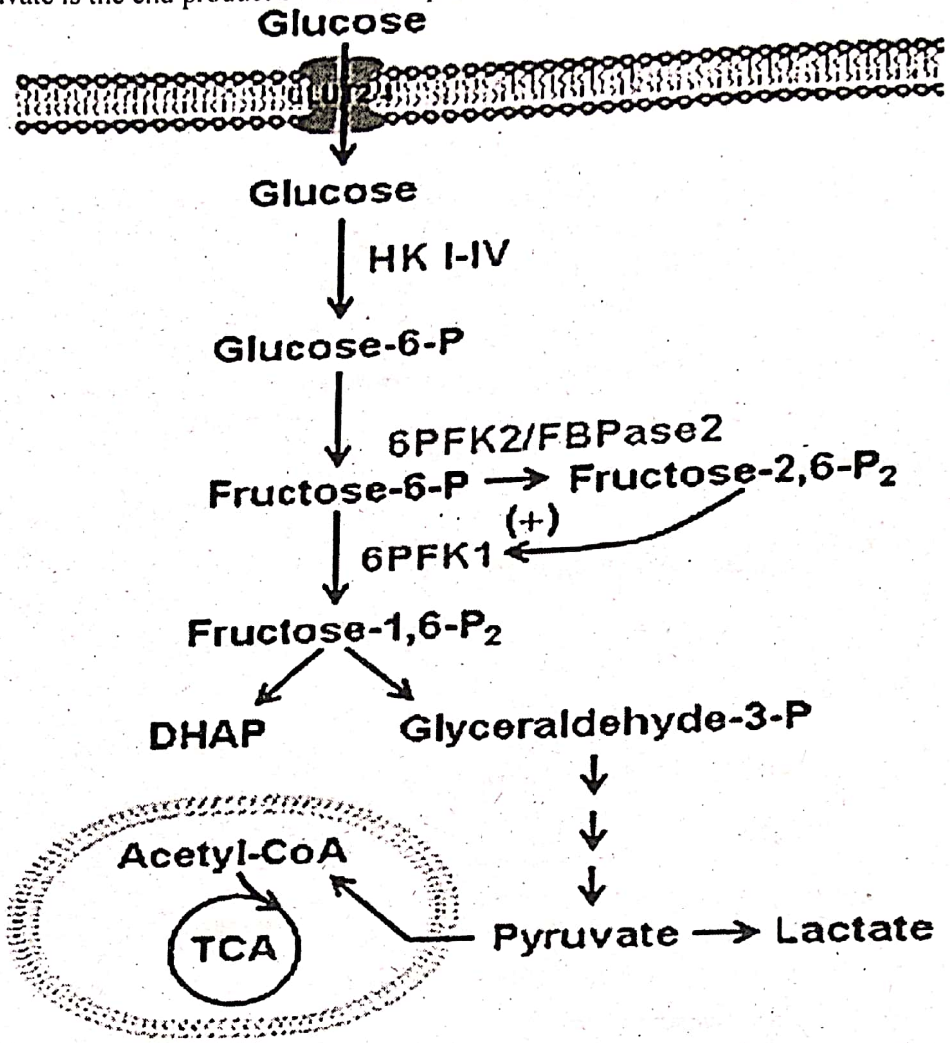
18. Ethanol production occur in anaerobic respiration.

19.

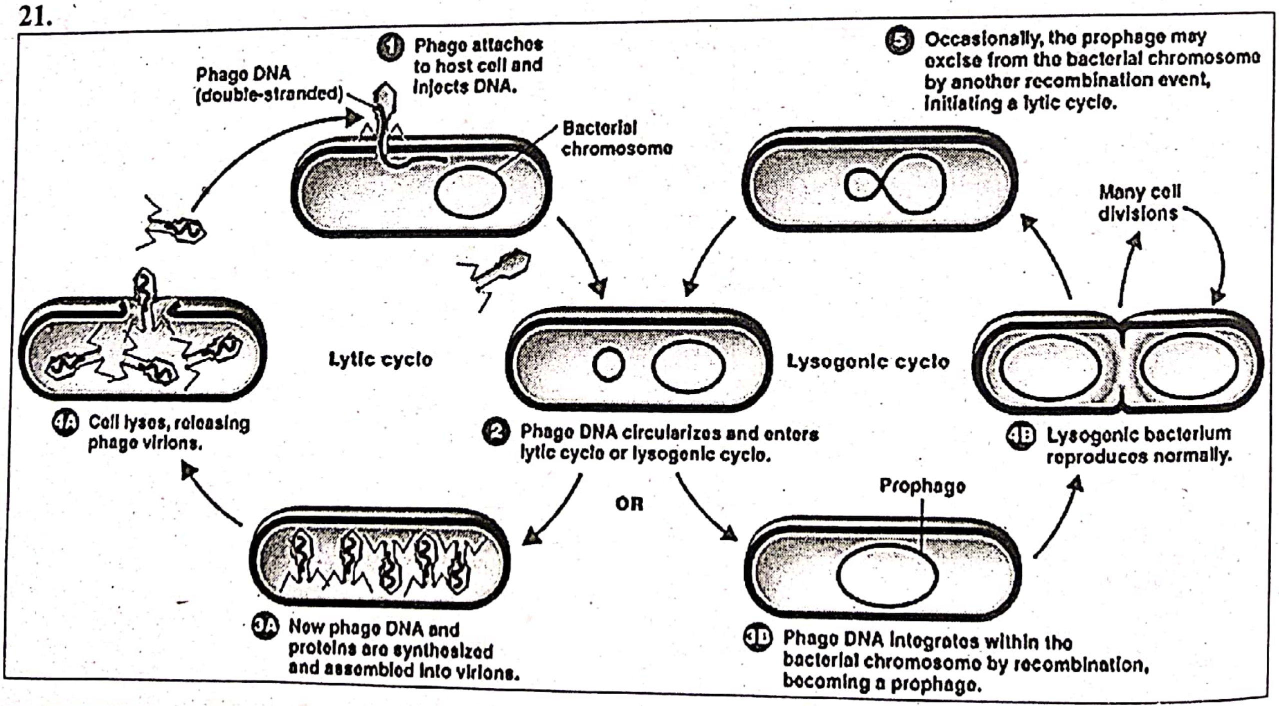
Glycolysis and Glycolytic Enzymes



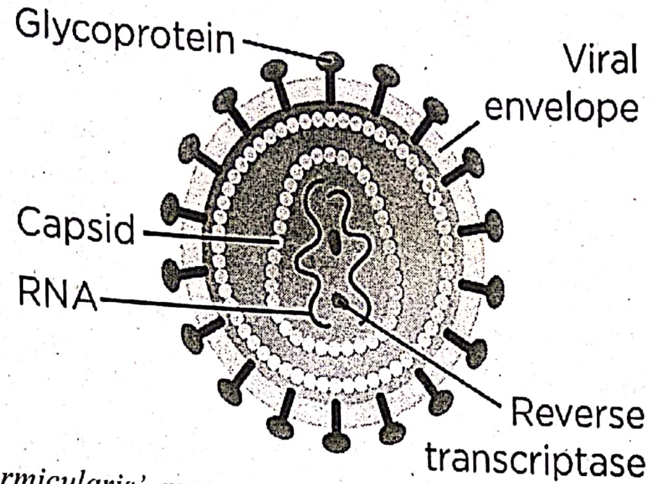
20. Pyruvate is the end product of oxidative phase of glycolysis.



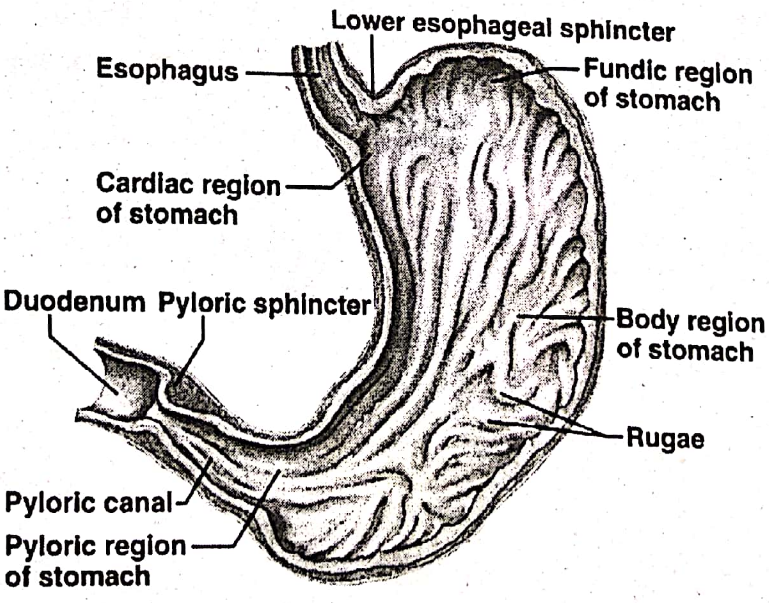
21.


① Phage attaches to host cell and injects DNA.
Phage DNA (double-stranded)
Bacterial chromosome
⑤ Occasionally, the prophage may excise from the bacterial chromosome by another recombination event, initiating a lytic cycle.
Many cell divisions
Lytic cycle
Lysogenic cycle
4A Cell lyses, releasing phage virions.
② Phage DNA circularizes and enters lytic cycle or lysogenic cycle.
4B Lysogenic bacterium reproduces normally.
OR
Prophage
3A New phage DNA and proteins are synthesized and assembled into virions.
3B Phage DNA integrates within the bacterial chromosome by recombination, becoming a prophage.

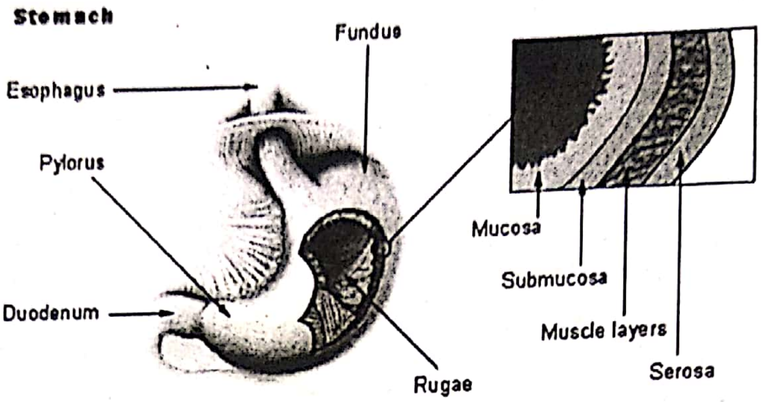
22. Bacteriophage is DNA non-enveloped virus.
23. Viruses are acellular life which can copy its genome by replication inside host cell by using host DNA polymerase.
24.



25. *Enterobius vermicularis'* movement causes intense itching of anus, inflammation of mucous membrane of colon and appendix resulting in insomnia and loss of appetite. It has no role in blood clotting.
26. Pin worm, Hook worm and *Ascaris* are parasites of gut, while Liver fluke is parasite of bile duct of liver an accessory digestive gland.
27. Hepatitis A and E is transmitted through contact with feces of effected person. House fly feeds on waste material therefore it may transmit hepatitis virus.
28. Leech is an ectoparasite of terrestrial and aquatic animals.
29. Principle digestion sites in human body are;
    1. Oral cavity
    2. Stomach
    3. Small intestine
30. Cheeks, palate, teeth and lips are the structure which bound oral cavity.
31.



32.



33. Sponges have no definite body organization, annelids and aschelminthes are triploblastic animals.

34. Carnivorous plants are plants that derive some or most of their nutrients from trapping and consuming animals or protozoans, typically insects and other arthropods. However, carnivorous plants generate energy from photosynthesis. Carnivorous plants have adapted to grow in places where the soil is thin or poor in nutrients, especially nitrogen

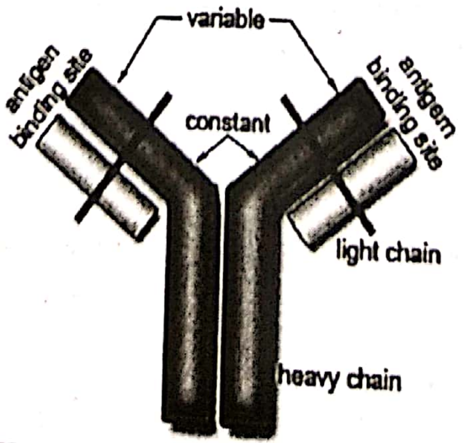
35. Pitcher plant-------*Sarracenia pupurea*
Sud dew -----------*Drosera intermedia*
Venus fly trap-----*Dionaea muscipula*

36. Heart produce sounds lub and dub due to closure of AV valve and SL valve respectively.

37.

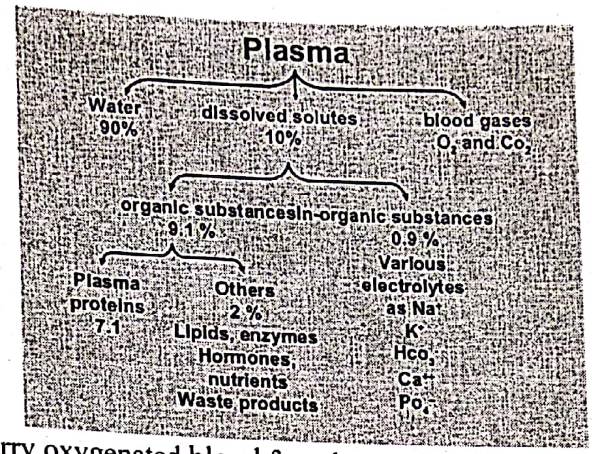
NON-SPECIFIC DEFENCES (INNATE IMMUNITY)		**SPECIFIC DEFENCES (ADAPTIVE IMMUNITY)**
First line of defense	**Second line of defense**	**Third line of defense**
• Skin • Mucous membranes • Secretions of skin and mucous membranes	• Phagocytic leukocytes • Antimicrobial proteins • Inflammatory response • Fever	• Lymphocytes • Antibodies • Memory cells

38.



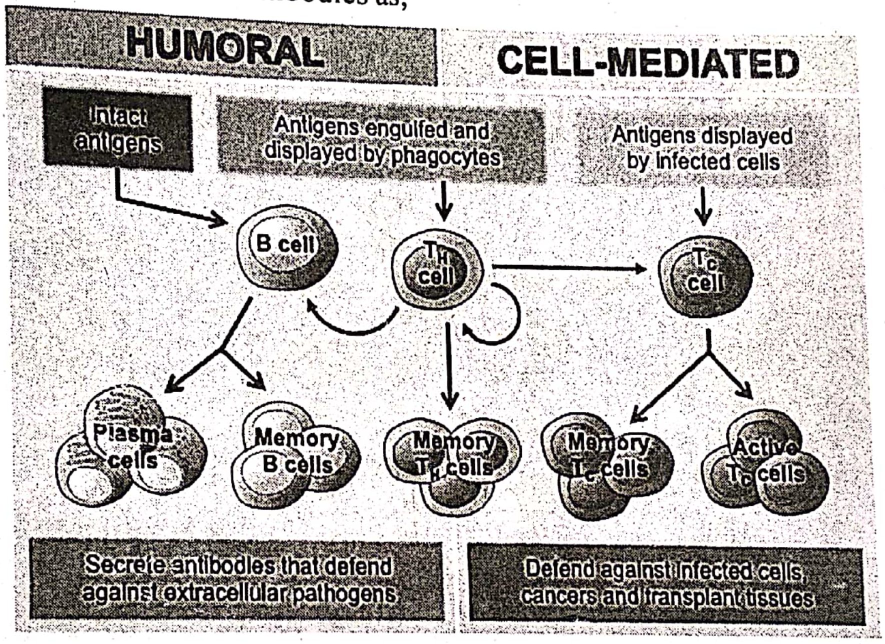
39. Senile RBCs are old RBCs, which become fragile due to their old age.

40.



41. Pulmonary vein carry oxygenated blood from lungs toward heart.

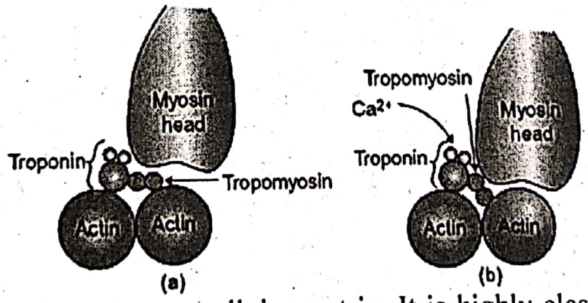
42. Plasma clone cells produce antibodies as;


HUMORAL
CELL-MEDIATED
Intact antigens
Antigens engulfed and displayed by phagocytes
Antigens displayed by infected cells
B cell
T_H cell
T_C cell
Plasma cells
Memory B cells
Memory T_H cells
Memory T_C cells
Active T_C cells
Secrete antibodies that defend against extracellular pathogens
Defend against infected cells, cancers and transplant tissues

43. Number of bones in human body are 206, out of which 80 bones are present in axial skeleton and 126 bones are present in appendicular skeleton.

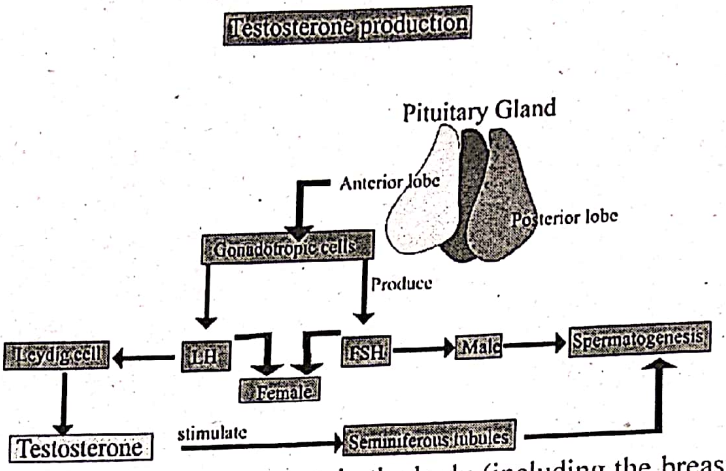
44. Ball and socket joint present between proximal of humerus and femur with scapula and pelvic bone respectively.

45.



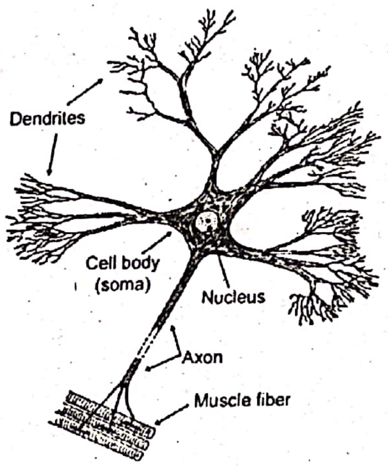
46. Elastin is a key protein of the extracellular matrix. It is highly elastic and present in connective tissue allowing many tissues in the body to resume their shape after stretching or contracting. Elastin helps skin to return to its original position when it is poked or pinched.

47.



48. Oxytocin is a hormone that acts on organs in the body (including the breast and uterus) and as a chemical messenger in the brain, controlling key aspects of the reproductive system, including childbirth and lactation, and aspects of human behaviour. ADH involve in water reabsorption.

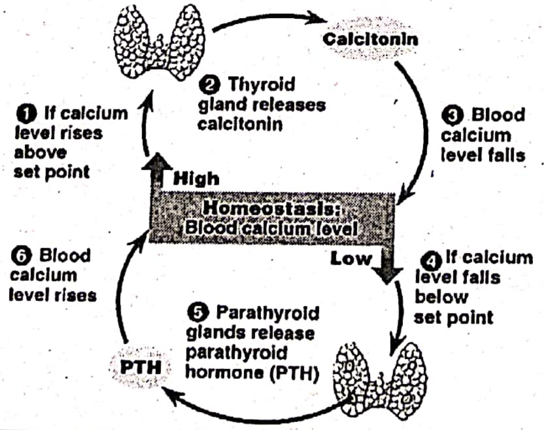
49.



50. Glia, also called glial cells or neuroglia, are non-neuronal cells in the central nervous system (brain and spinal cord) and the peripheral nervous system that do not produce electrical impulses. They maintain homeostasis, form myelin in the peripheral nervous system, and provide support and protection for neurons.

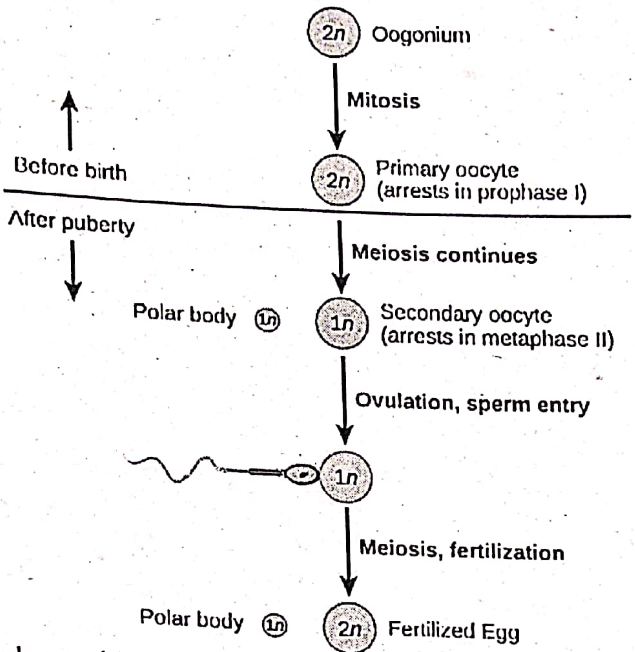
51. All hormones are complex organic molecules. With respect to their chemical nature they may be classified as protein or steroid.

52.


Calcitonin
❷ Thyroid gland releases calcitonin
❶ If calcium level rises above set point
❸ Blood calcium level falls
High
Homeostasis: Blood calcium level
Low
❻ Blood calcium level rises
❹ If calcium level falls below set point
❺ Parathyroid glands release parathyroid hormone (PTH)
PTH

53. During secretory phase of reproductive cycle progesterone produce in its maximum concentration, which cause further vascularization of endometrium to increase its thickness, and prepare it for implantation of embryo.

54.



55. Placenta release placental lactogen hormone which prepare female mammary glands for lactation. It also play role in diabetogenic effect of pregnancy .

56. Hemophilia is a rare disorder in which your blood doesn't clot normally because it lacks sufficient blood-clotting proteins (clotting factors). If you have hemophilia, you may bleed for a longer time after an injury than you would if your blood clotted normally.

57. Alleles are alternative forms of a gene, and they are responsible for differences in phenotypic expression of a given trait. Instances in which a particular gene may exist in three or more allelic forms are known as multiple allele conditions.

58. Gene for albinism is linked with chromosome 11, which is autosomal chromosome.

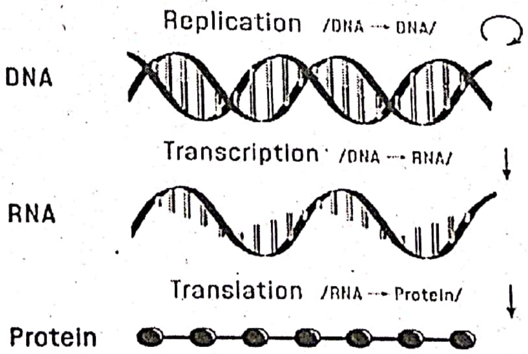
59. x-linked traits never directly transfer from father to son, because sone inherit his X-chromosome from mother not from father.

60. Codominance means that neither allele can mask the expression of the other allele. An example in humans would be the ABO blood group, where alleles A and alleles B are both expressed. So if an individual inherits allele A from their mother and allele B from their father, they have blood type AB.

61. Dominance, epistasis and pleiotropy form physiological relationship.

62. Gene for gout is linked with sex chromosomes.

63.



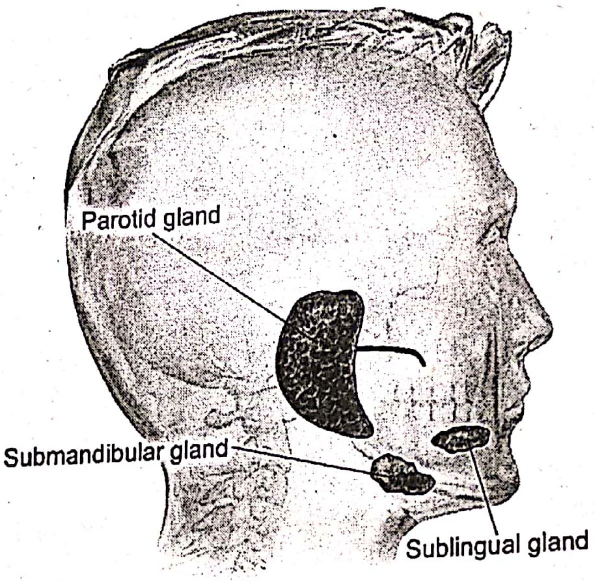
64. A mutation is a change that occurs in our DNA sequence. Migration is the movement of organism from one region to another. Genetic drift is a mechanism of evolution in which allele frequencies of a population change over generations due to chance.

65. Cytochrome a is a respiratory protein which present in all aerobic organism.

66. Eustachian tube is a narrow passage leading from the pharynx to the cavity of the middle ear, permitting the equalization of pressure on each side of the eardrum.

67. Phospholipids are class of lipids. While others are conjugated molecules.

68.



Salivary Glands

1 TOPIC

BIO-DIVERSITY (ACELLULAR LIFE/VARIETY OF LIFE)

PRACTICE EXERCISE

TOPIC-WISE MCQs

Q.1 Viruses may not replicate in:
[✓ A. Blood Plasma]
B. Skin cell
C. A plant cell
D. Hepatocytes

Q.2 Nucleic acid is the only component of:
A. Virus
B. Virion
[✓ C. Viroid]
D. Prion

Q.3 It is false for viruses:
[✓ A. Viruses contain both DNA and RNA]
B. Viruses are non-cellular
C. No independent metabolic activities
D. Tiny and infectious agent

Q.4 In prions, information is carried further through:
A. DNA
B. RNA
[✓ C. Proteins]
D. Glycoproteins

Q.5 The filterable agents were first purified in 1935, when Stanley was successful in crystallizing the virus:
A. Polio
[✓ B. Tobacco mosaic Virus]
C. Hepatitis
D. Influenza

Q.6 Viruses cannot be grown on artificial culture media because they are:
A. Facultative parasites
B. Endoparasites
[✓ C. Obligate parasites]
D. Ectoparasites

Q.7 It is present in all the viruses:
A. DNA
B. RNA
[✓ C. Capsid]
D. Envelop

Q.8 The component responsible for determination of shape of virus is:
A. Kind of nucleic acids
[✓ B. Protein subunits]
C. Kind of hosts
D. Viral envelop

Q.9 Which of the following is not essential part of virus?
A. Nucleic acid
B. Capsid
[✓ C. Envelope]
D. None of these

Q.10 A virion is a:
[✓ A. Virus]
B. Capsid
C. Viral lysozyme
D. Viral gene

Q.11 __________ capsomeres are present in capsid of herpes virus.
A. 152
[✓ B. 162]
C. 252
D. 262

Q.12 Members of which of the following group are all parasites?
[✓ A. Viruses]
B. Fungi
C. Bacteria
D. Protozoa

Q.13 Polio viruses are:
A. Tadpole shaped
B. Rod shaped viruses
[✓ C. Spherical viruses]
D. Spring like

Q.14 The genome of most of the animal viruses contain:
A. DNA
B. Protein
[✓ C. RNA]
D. Both DNA and RNA

Q.15 TMV are:
A. Tadpole shaped
[✓ B. Rod shaped viruses]
C Helical shaped
D. Spherical viruses

Q.16 Volume of bacteriophage is about _____ of host.
[✓ A. 1/10]
B. 1/100 times
C. 1/100
D. 1/1000

Q.17 The enzyme involved in viral replication are synthesized:
[✓ A. By the host cell]
B. On the interior surface of viral membrane
C. On the viral ribosomes
D. On the interior surface of viral coat

Q.18 In lytic cycle of bacteriophage, the phage is regarded as:
[✓ A. Master]
B. Inducer
C. Guest
D. Slave

Q.19 The part of bacteriophage that enters the host cell is:
A. Protein sheath
[✓ B. Genome]
C. Protein coat
D. Tail

Q.20 The bacteriophage attaches itself by its tail to the cell wall of bacterium at:
A. Anywhere on the cell
B. Adhering surface
[✓ C. Receptor site]
D. Binding site

Q.21 When a virus is in the lysogenic cycle, which of these will occur?
[✓ A. Viral DNA becomes incorporated into the host DNA]
B. Host cell produces many new viruses before it breaks apart
C. The viral DNA replicates and it separated by the cell's spindle apparatus
D. Antiviral defenses of the cell expel the viral DNA

Q.22 Most commonly, lesions can be seen around mouth, lips and at other skin sites in:
A. Influenza
B. Polio
C. Mumps
[✓ D. Herpes]

Q.23 Viral inflammation of parotid gland is commonly associated with:
[✓ A. Mumps]
B. Small pox
C. Herpes simplex
D. Influenza

Q.24 All of the following are viral diseases except:
A. Influenza
B. Polio
C. Mumps
[✓ D. Tetanus]

Q.25 Hepatitis A virus is:
[✓ A. RNA]
B. Viroi
C. DNA
D. ss DNA

Q.26 HAV is transmitted through:
A. Blood
B. Serum
[✓ C. Fecal-oral route]
D. Syringes

Q.27 Virus that attack on spinal cord is:
A. Rabies
B. HIV
C. Toga virus
[✓ D. Poliovirus]

Q.28 Poliomyelitis affects:
A. Sensory neuron
B. Brain
[✓ C. Motor neuron]
D. Muscles

Q.29 Which one is not RNA virus?
[✓ A. Small pox virus]
B. Mumps and Measles virus
C. Influenza virus
D. Polio virus

Q.30 Small Pox is caused by Pox virus which is:
A. DNA Naked Virus
B. RNA Enveloped Virus
C. RNA Naked Virus
[✓ D. DNA Enveloped Virus]

Q.31 Mad cow disease is caused by:
A. Virus
B. Virion
[✓ C. Viroid]
D. Prion

Q.32 Hepatitis C is also known as:
A. Infections Hepatitis
B. Serum Hepatitis
[✓ C. Infusion Hepatitis]
D. Delta Hepatitis

Q.33 Pigs are reservoir for:
A. Hepatitis A
B. Hepatitis B
C. Hepatitis C
[✓ D. Hepatitis E]

Q.34 Retroviruses contain:
[✓ A. Single stranded RNA]
B. Double stranded RNA
C. Single stranded DNA
D. Double stranded DNA

Q.35 Major Cells that are infected by HIV are:
A. B-lymphocytes
[✓ B. T-Helper cells]
C. Natural cells
D. T-Lymphocytes

Q.36 It acts as a template strand for reverse transcriptase:
A. Viral DNA
B. Host DNA
[✓ C. Viral RNA]
D. T-lymphocytes

Q.37 The phenomenon of transcription in HIV life cycle occurs in:
[✓ A. Nucleus]
B. Inside viral capsid
C. Cytoplasm
D. None of these

Q.38 Attachment of HIV DNA with host DNA is done via action of:
[✓ A. Integrase]
B. Reverse transcriptase
C. Protease
D. Nuclease

Q.39 HIV can be transmitted by all of the following sources except:
A. Intimate sexual contact
B. Contact with blood
C. Breast feeding
[✓ D. Saliva]

Q.40 Uncoating of HIV virion occurs:
A. Outside the cell
[✓ B. In cytoplasm]
C. In nucleus
D. At any place

PAST PAPER MCQs

Q.41 Which of the following cells are mainly infected by HIV? **(MDCAT 2014)**
A. T-killer lymphocytes
B. B-plasma cells
[✓ C. T-helper lymphocytes]
D. B-memory cells

Q.42 Which virus that infects humans has no vector and is unable to survive outside human body: **(KMDC 2014)**
A. Polio virus
B. Mumps virus
C. Chicken pox virus
[✓ D. None of these]

Q.43 Polio vaccine is given by: **(KMDC 2014)**
A. Spray
B. Tablets
[✓ C. Oral drops]
D. Local application

Q.44 HIV is classified as: **(MDCAT 2015)**
A. Bacteriophage
[✓ B. Retrovirus]
C. Oncovirus
D. Icosahedral virus

Q.45 AIDS is caused by: **(MDCAT 2016)**
A. Bacteria
B. Fungi
[✓ C. Virus]
D. Alga

Q.46 Cilia and flagella are absent in: **(MDCAT 2017)**
[✓ A. Viruses]
B. Higher plants
C. Bacteria
D. Lower animals

Q.47 Which one is not an opportunistic disease related to HIV infection: **(ETEA 2017)**
[✓ A. Destruction of body immune system]
B. Recurrent pneumonia
C. Pulmonary tuberculosis
D. Toxoplasmosis

Q.48 In viruses, a combined structure formed by core (Nucleic Acid) and capsid is: **(MDCAT 2018)**
[✓ A. Nucleocapsid]
B. Capsomeres
C. Envelope
D. Prions

Q.49 Which of the following is the simplest forms of pathogens causing disease? **(NTS 2018)**
A. Viruses
[✓ B. Prions]
C. Fungus
D. Amoeba

Q.50 Which is not a viral disease? **(NTS 2018)**
A. AIDS
[✓ B. Malaria]
C. Chicken pox
D. Influenza

Q.51 Taxonomy includes the arrangement of organisms into different taxa. Which of the following represents the correct hierarchy of various taxa of classification? **(MDCAT 2019)**
[✓ A. Species, genus, family, order, class, phylum]
B. Order, family, class, phylum, kingdom
C. Species, genus, order, family, class, phylum
D. Species, genus, family, class, order, phylum

Q.52 Capsid, the protective coat of a virus is made up of subunits known as capsomeres. **(MDCAT 2019)**
A. Lipid
B. RNA
[✓ C. Protein]
D. DNA

Q.53 Among followings, ________ enzyme is naturally found in human immunodeficiency virus. **(MDCAT 2019)**
A. DNA polymerase
[✓ B. Reverse transcriptase]
C. RNA polymerase
D. Ligase

Q.54 The main target of HIV in AIDS is: **(AJK 2019)**
A. Liver cells
B. B-lymphocytes
C. Red blood cells
[✓ D. Helper T-lymphocytes]

Q.55 The genome of influenza virus is made up of: **(ETEA 2019)**
[✓ A. Single strand RNA]
B. Double strand DNA
C. Single strand DNA
D. Double stranded RNA

Q.56 The bacteriophage replicates only inside the: **(ETEA 2019)**
A. Animal cell
[✓ B. Bacterial cell]
C. Fungal cell
D. Both (A) & (B)

Q.57 Virus can only survive and reproduce inside a: **(NTS 2019)**
A. Animal cells
B. Bacterial cells
[✓ C. Living cells]
D. Non-living cells

Q.58 Genome of virus is composed of: **(NTS 2019)**
A. DNA
B. RNA
[✓ C. A and B]
D. Protein

Q.59 Which of the following is not related to enveloped virus? (PMC 2020)
A. They survive for a short time
[✓ B. They are tolerant to antibodies]
C. Their envelop is sensitive to sunlight
D. Envelope is derived from host

Q.60 The complete mature and infection virus particle is known as: (PMC 2020)
A. Venome
[✓ B. Virion]
C. Genome
D. Capsid

Q.61 Numerous opportunistic diseases might attack a person suffering from which of the following diseases: (PMC 2020)
A. Measles
B. Hepatitis A
C. Influenza
[✓ D. AIDS]

Q.62 Which of the following is not true about human immunodeficiency virus HIV? (PMC 2020)
A. It is a retrovirus
B. It is surrounded by an envelope
[✓ C. It does not cause AIDS]
D. It causes deficiency of the human immune system

ANSWER KEY

TOPIC-WISE MCQs & PASPT PAPER MCQs

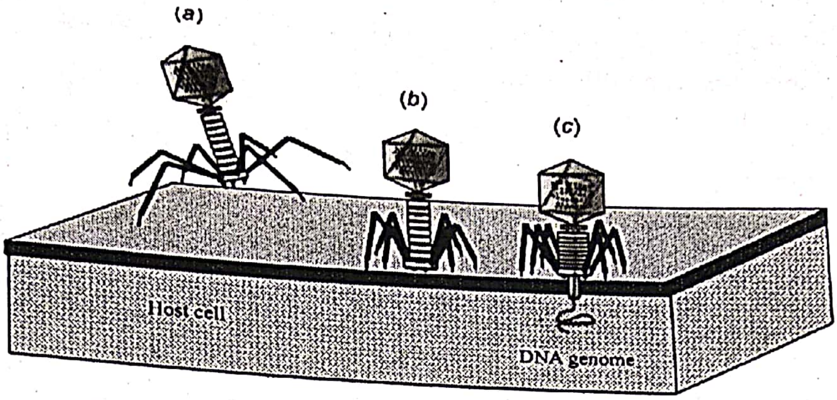
1	A	11	B	21	A	31	C	41	C	51	A	61	D
2	C	12	A	22	D	32	C	42	D	52	C	62	C
3	A	13	C	23	A	33	D	43	C	53	B		
4	C	14	C	24	D	34	A	44	B	54	D		
5	B	15	B	25	A	35	B	45	C	55	A		
6	C	16	A	26	C	36	C	46	A	56	B		
7	C	17	A	27	D	37	A	47	A	57	C		
8	B	18	A	28	C	38	A	48	A	58	C		
9	C	19	B	29	A	39	D	49	B	59	B		
10	A	20	C	30	D	40	B	50	B	60	B		

EXPLANATORY NOTES

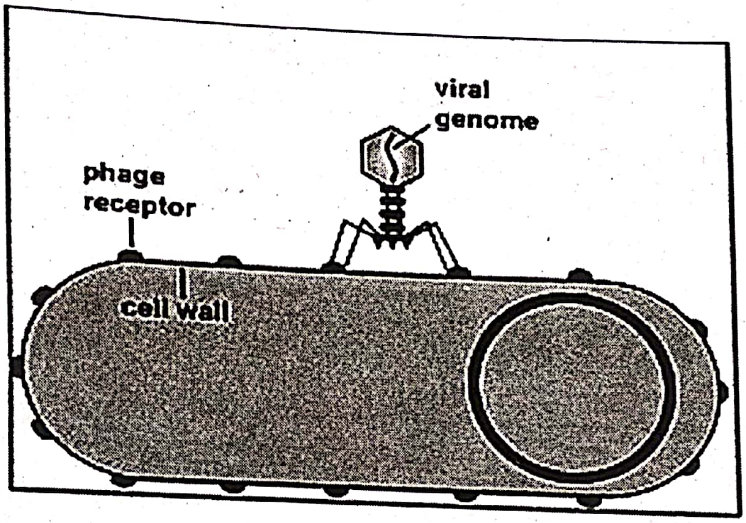
TOPIC-WISE MCQs & PAST PAPER MCQs

1. One of the most important features of viruses is that they can reproduce only in animal or plant cells or in micro-organisms, where they reproduce by replication. Hence, viruses are said to be the obligate intra-cellular parasites. Blood without blood cells is blood plasma and it cannot provide machinery for viral replication.
2. Viroids are made up of only small, circular ssRNA molecules. Prions are of controversial nature and chemically, these are composed of mis-folded or infectious proteins. Virions are complete, mature and infectious particles.
3. Viruses are composed of central core of nucleic acid, either DNA or RNA but not the both, which is also known as the genome and is surrounded by a protein coat, the capsid.
4. Prions are miss-folded or infectious proteins with the ability to transmit their mis-folded shape onto normal variants of the same protein.
5. Stanley was the first scientist who crystallized tobacco mosaic virus in 1935.
6. Viruses cannot grow on artificial media because lack metabolic machinery for the synthesis of their own nucleic acid and protein.
7. A capsid is the protein shell of a virus, enclosing its genetic material. It consists of several oligomeric (repeating) structural subunits made of protein called protomers.
8. The viral capsid is made up of protein subunits known as capsomeres. The number of capsomeres is characteristics of a particular virus and gives definite shape to the virion.
9. Viruses are made up of protein capsid and nucleic acid. There are some viruses that have an additional covering of host plasma membrane known as envelope. Envelope is derived from host plasma membrane; it is not essential part of virus.
10. Complete, mature and infectious particles are known as virions.
11. Capsid of viruses is made up of protein subunits known as capsomeres. Number of capsomeres is characteristic of a particular virus i.e., herpes virus has 162 capsomeres and adenovirus has 252 capsomeres in their capsid.
12. Bacteria can be parasitic, saprotrophic, chemosynthetic, photosynthetic and symbiont.
    - Fungi can be parasitic and saprotrophic.
    - Protozoa can be parasite or free living.
13. Spherical (Polio)
    - Rod-like (TMV)
    - Tadpole (Lambda phages)
14. Animal virus contains DNA or RNA as genetic material but mostly animal viruses are RNA viruses.
15. Common shapes of viruses:
    - Spherical (Polio)
    - Rod-like (TMV)
    - Tadpole (Lambda phages)
16. The volume of bacteriophage is 1000 times smaller than that of bacterium.
17. Viruses do not have their own biosynthetic machinery but depend upon host for replication.
18. In lytic cycle of life cycle of bacteriophage, the phage overtakes the host machinery and form master slave relationship, while in lysogenic cycle virus form host guest relationship.

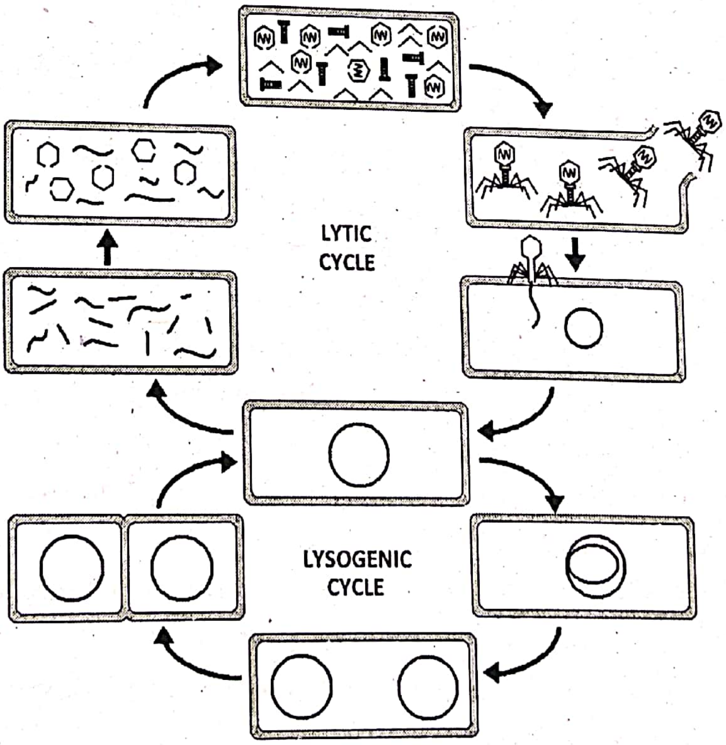
19.


(a)
(b)
(c)
Host cell
DNA genome

20.

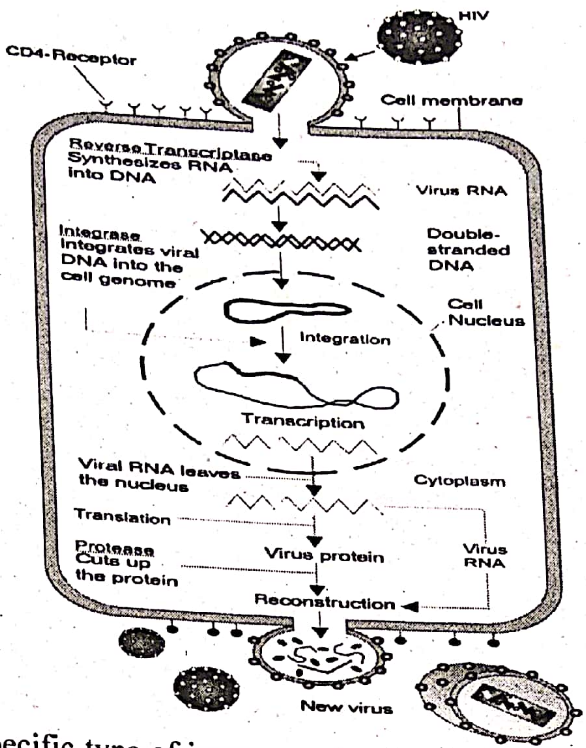

viral genome
phage receptor
cell wall

21.


LYTIC CYCLE
LYSOGENIC CYCLE

22. In oral herpes, blisters are usually formed at these sites.
23. Mumps belongs to group paramyxoviruses. It is highly contagious and this disease cause painful swelling of parotid glands.
24. Tetanus is a bacterial disease caused by *Clostridium tetani.*
25. Viruses can be classifying on the bases of genome, HAV contains single standard RNA, HBV contains DNA and HCV contains RNA.
26. The virus spreads by the fecal–oral route, and infections often occur in conditions of poor sanitation and overcrowding.
27. Polio virus replicates in oropharynx,. intestine and spread through blood to nervous system. Polio virus replicates in motor neuron located in spinal cord. Death of these cell result in paralysis.
28. Polio virus replicates in oropharynx, intestine and spread through blood to nervous system. Polio virus replicates in motor neuron located in spinal cord. Death of these cell result in paralysis.
29. Pox virus is DNA enveloped; Mumps, measles and poliovirus have RNA as their genetic material.
30. Pox virus is DNA enveloped virus which caused epidemic in the past causing small pox, but now this disease has been eradicated from the world.
31. Prions are infectious particles made up of only proteins containing information for replication and cause mad cow infection and mysterious brain infection in man.
32. Hepatitis C virus is RNA enveloped virus that causes infusion hepatitis. Hepatitis A is known as infectious hepatitis, while the common name of hepatitis B is serum hepatitis.
33. Most recent work of Halbur and coworker (2001) reveals that pig could be the source of infection of hepatitis E.
34. All retroviruses are RNA viruses, containing copies of single stranded RNA as genome.
35. HIV attacks on specific type of immune cell in the body, known as T-helper cells. When HIV destroys these cells, then it becomes difficult for the body to fight against the infections.
36. HIV is equipped with reverse transcriptase along with the other essential enzymes. Reverse transcriptase responsible for reverse transcription, during which viral genomic ssRNA is converted into viral dsDNA in the cytoplasm of helper T-cells.
37. In HIV infected helper T-cells, the process of transcription occurs in nucleus while the process of reverse transcription occurs in cytoplasm.
38. HIV integration is the insertion of HIV genetic material into the genome of the infected cell. This process is completed with the help of integrase.
39. Modes of transmission of HIV are blood transfusion, sexual contacts and breast feeding. Saliva is not the source of transmission of HIV.

40.



41. HIV attacks a specific type of immune cell in the body, known as T-helper cells. When HIV destroys these cells, then it becomes difficult for the body to fight against the infections.

42. All viruses cause infection in human beings and transfer by specific vector. Viruses always depends on living host for their survival.

43. Live vaccine of polio given orally, while killed vaccines given by injection.

44. Retroviruses are RNA viruses. After infecting their host cells, the retrovirus uses an enzyme called reverse transcriptase to convert its genomic RNA into DNA. The retrovirus then integrates its viral DNA into the DNA of the host cell, which allows the retrovirus to replicate. One typical example of retrovirus is HIV.

45. AIDS is a chronic, potentially life-threatening condition caused by the HIV. By damaging the immune system, HIV interferes with body's ability to fight infection and disease.

46. Viruses are infectious particles made up of protein coat known as capsid and genome either DNA or RNA. Both cilia and flagella are absent in viruses.

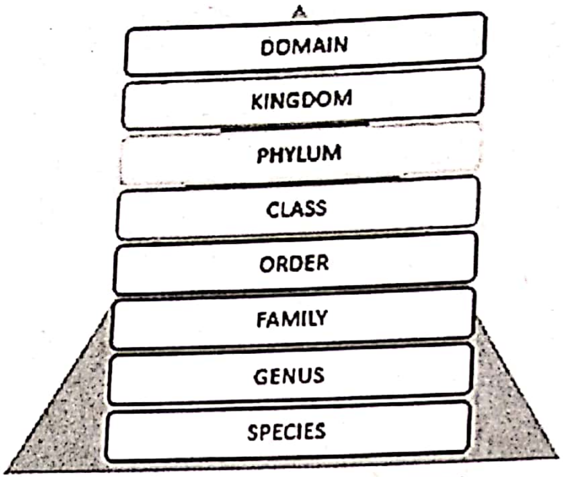
47. Opportunistic infections (OIs) are infections that occur more often or are more severe in people with weakened immune systems than in people with healthy immune systems. People with weakened immune systems include people living with HIV.

48. All viruses contain two main components; genome of either DNA or RNA and a protein coat, called the capsid, which covers the genome. Together this is called the nucleocapsid. In addition, many animal viruses contain a lipid bilayer envelope. The entire intact virus is called the virion.

49. Prions are simplest form of pathogens because they are only proteins structurally. Viruses are nucleoproteins. Fungi is multicellular and eukaryotic organisms. Amoeba is eukaryotic and unicellular organism.

50. Malaria is caused by plasmodium which is animals like protists.

51.



SCIENTIFIC CLASSIFICATION

52. Chemically, a virion is made up of a core of genetic material; either DNA or RNA, surrounded by a protective coat called a capsid which is made up of protein.

53. HIV particles are equipped with reverse transcriptase, integrase and proteases while DNA polymerase, RNA polymerase and ligase are absent in HIV.

54. HIV infects a type of white blood cell in the body's immune system called a T-helper cell (also called a CD4 cell). These vital cells keep us healthy by fighting off infections and diseases.

55. Influenza is RNA enveloped virus.

56. A bacteriophage also known informally as a phage, is a virus that infects and replicates within bacterial cell.

57. Viruses are obligate intracellular parasites.

58. Viruses may have DNA or RNA as its genetic material.

59. Antibiotics are useless against viral infections. This is because viruses are so simple that they use their host cells to perform their activities for them. So antiviral drugs work differently to antibiotics, by interfering with the viral enzymes instead.

60.

Virions	Prions	Viroids
Complete, mature and infectious particles.	Chemically, these are composed of mis-folded or infectious proteins.	Made up of only small, circular ssRNA molecules.

61. AIDS results into loss of immunity which may leads to opportunistic infection.

62. Causative agent of AIDS is HIV.

2 TOPIC

BIO-ENERGETICS

PRACTICE EXERCISE

TOPIC-WISE MCQs

Q.1 Spectrophotometer is used to measure:

A. Absorption of CO_2

B. Absorption of O_2

C. Reflection of pigments

[✓ D. Absorption of different wavelengths]

Q.2 Which shows the effectiveness of wavelengths of light driving photosynthesis?

A. Absorption spectrum

[✓ B. Action spectrum]

C. Broad spectrum

D. Narrow spectrum

Q.3 Carotenoids absorb strongly:

A. Red to orange

B. Yellow green

C. Yellow red

[✓ D. Blue violet]

Q.4 The most abundant protein in chloroplast is:

[✓ A. Rubisco]

B. RUBP

C. Ribulose bisphosphatase

D. Ribulose bisphosphate hydrogenase

Q.5 Magnesium is central part of:

[✓ A. Porphyrin ring]

B. Phytol tail

C. Pyrrole ring

D. Hydrophobic part

Q.6 The products of photosynthesis in green plants are:

A. $C_6H_{12}O_6+6O_2$

B. $(CH_2O)_n+H_2O+2S$

C. $C_6H_{12}O_6+6O_2+H_2O+$ energy

[✓ D. $C_6H_{12}O_6+6O_2+6\ H_2O$]

Q.7 Location of phytol tail of chlorophyll b is:

A. Stroma

[✓ B. Thylakoid membrane]

C. Thylakoid surface

D. Thylakoid lumen

Q.8 Some photosynthetic organisms contain chloroplasts that lack photosystem II, yet are able to survive. The best way to detect the "lack of photosystem II" in these organisms would be:

A. To determine if they have thylakoids in the chloroplasts

B. To test for liberation of O_2 in the light

C. To test for CO_2 fixation in the dark

[✓ D. To do experiments to generate an action spectrum]

Q.9 Which one of the following is not function of carotenoids?

[✓ A. Convert light energy into chemical energy]

B. Protect Chlorophyll

C. Transfer energy

D. Protect human eye

Q.10 Chlorophyll consists of:

A. A head of phytol and tail of four pyrrole rings

B. A head of linked carbons and tail of four pyrrole rings

C. A head of four pyrrole rings and tail of linked nitrogen

[✓ D. A head of four pyrrole rings and a phytol tail]

Q.11 Following is correct sequence of energy transfer between photosynthetic pigments:

A. Chl.a→Chl.b→Carotenoids

[✓ B. Carotenoids →Chl.b→Chl.a]

C. Chl.b→Carotenoids →Chl.a

D. In any direction

Q.12 Conversion of light energy into chemical energy is function of:
A. Mitochondria
B. Cytoplasm
C. Stroma of chloroplast
[✓ D. Grana]

Q.13 All of the followings are differences between Chl. 'a' and 'b' except:
A. Chl.a has different types while Chl.b has single type
B. Chl.a have functional group $-CH_3$ but Chl.b has $-CHO$
C. Chl.a is necessary pigment but Chl.b is accessory pigments
[✓ D. Chl.a is present in antenna complex while Chl.b is in reaction center]

Q.14 The source of oxygen released during photosynthesis is:
[✓ A. Water]
B. CO_2
C. Glucose
D. Oxidation of chlorophyll

Q.15 Van Neil hypothesis about the production of oxygen during photosynthesis was based on the study and investigations on:
[✓ A. Bacteria]
B. Algae
C. Protonema
D. Cyanobacteria

Q.16 Incorrect statement for photosynthesis is:
A. It occurs during daytime
B. It uses water with CO_2
C. It requires chlorophyll
[✓ D. It uses oxygen]

Q.17 Which is not true for dark reaction?
A. Does not require light directly
B. It uses ATP
[✓ C. Also called Z-scheme]
D. G3P is produced

Q.18 Where does the light reactions take place?
A. Stroma
[✓ B. Thylakoid membrane]
C. Chloroplast
D. Leucoplast

Q.19 The final acceptor of electrons during the noncyclic electron pathway is:
A. Photosystem I
B. Photosystem II
C. ATP
[✓ D. $NADP^+$]

Q.20 PS-I is named as it:
A. Absorbs wavelength of 680 nm
[✓ B. Discovered earlier than PS-II]
C. Absorbs wavelength of 700 nm
D. Slightly located upward than PS-II

Q.21 Each photon of light excites how many electrons:
[✓ A. 1]
B. 4
C. 2
D. 6

Q.22 Water splits during photosynthesis in/on:
[✓ A. Interior space of thylakoid]
B. Outside the thylakoid membrane
C. Into the stroma
D. At ATP synthase complex

Q.23 During cyclic photophosphorylation, electrons pass from all except:
A. Photosystem I
B. Ferredoxin
[✓ C. Photosystem II]
D. Cytochrome complex

Q.24 $NADPH_2$ is produced in photosynthesis during:
A. Dark reaction
B. Pseudo cyclic photophosphorylation
[✓ C. Non-cyclic photophosphorylation]
D. Cyclic photophosphorylation

Q.25 $NADP^+$ reductase transfers electron from:
A. $NADP^+$ to ferredoxin
[✓ B. Ferredoxin to $NADP^+$]
C. ADP to ATP
D. Cytochrome complex to $NADP^+$

Q.26 **Which of the following is correct sequence for the movement of electrons during non-cycling photophosphorylation?**
A. P680→P700→water→$NADP^+$
B. Water →P700→P680→$NADP^+$
[✓ C. Water→P680→P700→$NADP^+$]
D. P680→P700 →$NADP^+$→water

Q.27 **Z-scheme is another name used for:**
A. Cyclic photophosphorylation
B. Calvin cycle
[✓ C. Non-cyclic photophosphorylation]
D. Oxidative phosphorylation

Q.28 **Photosystem II has reaction center of:**
[✓ A. P_{680}]
B. P_{700}
C. P_{730}
D. P_{660}

Q.29 **The process in which carbon from CO_2 is incorporated into organic molecules:**
A. Glycolysis
[✓ B. Calvin cycle]
C. Krebs cycle
D. Light dependent reactions

Q.30 **Which statement is not true about the noncyclic electron pathway?**
A. It absorbs photons into PS-I
B. It is a long pathway
C. It produces ATP
[✓ D. Carbon dioxide fixation]

Q.31 **Which is most necessarily associated with the Calvin cycle?**
A. ATP production
B. Oxygen production
[✓ C. Carbon dioxide fixation]
D. Carbon dioxide production

Q.32 **The product of the dark reaction is:**
A. ATP
B. NADPH
[✓ C. G3P]
D. PEP

Q.33 **If 12 NADPH are used in Calvin cycle, then how many glucose molecules will be formed:**
[✓ A. One]
B. Six
C. Two
D. Twelve

Q.34 **Calvin cycle is also known as C_3 pathway due to:**
A. Initial incorporation of 3 CO_2molecules
B. Production of 3 carbon G3P
[✓ C. Production of 3 carbon 3PGA]
D. Cycle has 3 steps

Q.35 **For fixing 3 molecules of CO_2 in Calvin cycle, what is needed?**
[✓ A. 9ATP + $6NADPH_2$]
B. 18ATP + $12NADPH_2$
C. 6ATP + $9NADPH_2$
D. 3ATP + $3NADPH_2$

Q.36 **In yeast, pyruvic acid is converted to:**
[✓ A. Ethyl alcohol]
B. Lactic acid
C. Acetic acid
D. Fumaric acid

Q.37 **About 2% energy of chemical bonds of glucose is converted into ATP by:**
A. Glycolysis
B. Chemiosmosis
[✓ C. Fermentation]
D. Calvin cycle

Q.38 **This process may have CO_2 as its products:**
A. Glycolysis
B. Chemiosmosis
[✓ C. Fermentation]
D. Calvin cycle

Q.39 **$C_3H_6O_3$ formation relates to:**
A. Glycolysis
B. The electron transport system
C. The Krebs cycle
[✓ D. Fermentation]

Q.40 **Cellular respiration is essentially a/an _______ process.**
[✓ A. Oxidation]
B. Redox
C. Reduction
D. Hydrogenation

Q.41 Which of the following types of mammalian cell does not carry out oxidative phosphorylation?
[✓ A. Erythrocytes]
B. Neuron
C. Oxyntic cell
D. Cardiac muscle cell

Q.42 The difference between respiration and combustion is related to respiration being:
A. Multistep reactions
B. Intracellular
C. Enzyme controlled
[✓ D. All A, B, C]

Q.43 In plants, energy is released during the process of:
A. Photosynthesis
[✓ B. Respiration]
C. Transpiration
D. Water absorption

Q.44 During process of lactic acid fermentation:
A. CO_2 is produced
[✓ B. NADH is oxidized]
C. Ethanol is produced
D. ATP are produced

Q.45 The molecule regenerated by fermentation:
A. O_2
B. ATP
[✓ C. NAD^+]
D. Pyruvate

Q.46 Water is released during conversion of:
[✓ A. 2-phosphoglycerate ⟶ PEP]
B. 3- phosphoglycerate ⟶ 2-phosphoglycerate
C. 1,3bisphosphoglycerate ⟶ 3- phosphoglycerate
D. G3P ⟶ 1,3bisphosphoglycerate

Q.47 Which one of the following represents de-phosphorylation?
A. Fructose 1-phosphate → Fructose 1,6-biphosphate
[✓ B. Fructose 1,3bisphosphoglycerate → 3 phosphoglycerate]
C. Fructose 1-phosphate → Fructose 6-phosphate
D. Glucose 6-phosphate → Fructose 1-phosphate

Q.48 Gross production of ATP molecules during glycolysis is:
A. 2
[✓ B. 4]
C. 6
D. 8

Q.49 The oxidation of succinate produces:
A. NADH
[✓ B. $FADH_2$]
C. Malate
D. ATP

Q.50 Both NADH and $FADH_2$ are formed during:
A. Glycolysis
B. The electron transport system
[✓ C. The Krebs cycle]
D. Fermentation

Q.51 When products of glycolysis pass through Krebs cycle, it will produce:
A. 2NADH, $2FADH_2$, 2ATP
B. 1NADH, $1FADH_2$, 1ATP
C. 1 NADH, 3 $FADH_2$, 2 ATP
[✓ D. 6 NADH, 2 $FADH_2$, 2 ATP]

Q.52 The precursor of fumarate during Krebs cycle require ________ for fumarate synthesis.
A. Succinate
B. Fumarate dehydrogenase
[✓ C. Succinate dehydrogenase]
D. FAD^+ Oxidase

Q.53 Which one of following give more ATP in ETC?
[✓ A. NADH]
B. $FADH_2$
C. Pyruvate
D. Glucose

Q.54 Before pyruvate enters the citric acid cycle, it is decarboxylated, oxidized and combined with coenzyme A, forming acetyl CoA, carbon dioxide and one molecule of:
[✓ A. NADH]
B. $FADH_2$
C. ATP
D. ADP

Q.55 **Starting from end products of glycolysis, how many CO_2 are produced up to the formation of succinate in a single Krebs cycle?**
A. 2
B. 12
C. 6
[✓ D. 3]

Q.56 **Which of the following process is used in the conversion of pyruvate to acetyl CoA?**
A. Decarboxylation
B. Dehydration
C. Dehydrogenation
[✓ D. Both A and C]

Q.57 **Which of the following is the final acceptor of electron in respiratory chain?**
A. Cytochrome a
B. Cytochrome a_3
[✓ C. Oxygen]
D. Hydrogen

Q.58 **Electron transport chain in mitochondria is used to:**
A. Synthesize $NADP^+$
B. Synthesize ADP
C. Create electron gradient
[✓ D. Create proton gradient]

Q.59 **Biological oxidation involves removal of hydrogen, linked with specific coenzymes and is catalyzed by:**
A. Carboxylase
B. Hydrogenases
[✓ C. Dehydrogenases]
D. Catalases

Q.60 **In respiratory chain, $FADH_2$ causes reduction of:**
[✓ A. Coenzyme Q]
B. Cytochrome a
C. Cytochrome c
D. Cytochrome b

Q.61 **The stage of cellular respiration producing maximum ATP:**
A. Glycolysis
B. Oxidation of pyruvate
C. Krebs cycle
[✓ D. Chemiosmosis]

Q.62 **Phosphofructokinase is inhibited by:**
A. Decrease in ATP
B. Decrease in citrate
C. Increase in NADH
[✓ D. Increase in ATP]

Q.63 **Phosphorylation of ADP during glycolysis occurs via:**
A. Photophosphorylation
B. Oxidative phosphorylation
C. Chemiosmosis
[✓ D. Substrate level phosphorylation]

Q.64 **In cellular respiration, product formed as a result of release of energy:**
[✓ A. ATP]
B. Oxygen
C. NADH
D. Glucose

Q.65 **The net gain of energy from one molecule of glucose during aerobic respiration in prokaryotes is:**
A. 2 ATP
[✓ B. 38 ATP]
C. 4 ATP
D. 40 ATP

Q.66 **ATP formation through oxidative phosphorylation involves:**
A. Light reactions
B. Dark reactions
[✓ C. Chemiosmosis]
D. Fermentation

PAST PAPER MCQs

Q.67 **The most common respiratory substrate as a source of energy is:** **(MDCAT 2014)**
[✓ A. Glucose]
B. Fructose
C. Sucrose
D. Insulin

Q.68 **Oxidative phase of glycolysis starts with dehydrogenation of:** **(MDCAT 2014)**
A. Glycolysis
[✓ B. Glyceraldehyde 3-phosphate]
C. Ribulose bisphosphate
D. NADH

Q.69 **Which one of the following is the stage of cellular respiration for which oxygen is not essential?** **(MDCAT 2014)**

[✓ A. Glycolysis]
B. Krebs cycle
C. Pyruvate oxidation
D. Electron Transport Chain

Q.70 **Pyruvate, the end product of glycolysis moves from cytosol to mitochondrial matrix where it is oxidized into ________ producing CO_2 as a by-product.** **(MDCAT 2014)**

[✓ A. Active acetic acid]
B. NAD^+
C. Citrate
D. FAD

Q.71 **Pyruvate $\longrightarrow$ Acetyl Co-A.** **(MDCAT 2014)**

A. $FAD^+ \rightarrow FADH$
B. $NADH \rightarrow NAD + H^+$
[✓ C. $NAD^+ \rightarrow NADH$]
D. $FADH^+ \rightarrow FAD + H^+$

Q.72 **In one turn, the Krebs cycle produces one molecule of ATP, one molecule of FADH2 and ________ molecules of NADH.** **(MDCAT 2014)**

A. 1
[✓ B. 3]
C. 2
D. 4

Q.73 **Which one of the following is the site of oxidative phosphorylation in mitochondria?** **(MDCAT 2014)**

[✓ A. Cristae]
B. Outer membrane
C. Matrix
D. Ribosomes

Q.74 **The process of fermentation is an efficient source of the following products which are valuable to human beings for making dairy products and pickles. what are they?** **(KMDC 2014)**

[✓ A. Lactic acid]
B. Ethyl alcohol
C. Acetone acid
D. Acetone

Q.75 **Organisms which can use inorganic CO2 are called:** **(KMDC 2014)**

A. Heterotrophs
[✓ B. Autotrophs]
C. Saprotrophs
D. Parasites

Q.76 **Which part of mitochondria is the site of the link reaction and the krebs cycle and contains the enzymes needed for these reactions?** **(KMDC 2014)**

A. Outer membrane
B. Inner membrane
[✓ C. Matrix]
D. Crista

Q.77 **What happens during the light phase of photosynthesis?** **(LUMMS 2014)**

A. ADP is hydrolyzed and NADP oxidized
[✓ B. ATP is synthesized by photophosphorylation and NADP reduced]
C. ATP is hydrolyzed and NADPH is oxidized
D. ATP is hydrolyzed and NADP reduced
E. ATP is phosphorylated and NADP oxidized

Q.78 **In light independent stage of photosynthesis, the CO2 combines with ________ to form an unstable 6-carbon intermediate.** **(MDCAT 2015)**

[✓ A. Ribulose bisphosphate]
B. Glycerate-3-phosphate
C. Hexose sugar
D. Glyceraldehyde-9-phosphate

Q.79 **In glycolysis, glycerate-1,3-bisphosphate is converted into glycerate-3-phosphate by losing ________ phosphate molecules.** **(MDCAT 2015)**

A. 3
[✓ B. 1]
C. 2
D. 4

Q.80 Malate is oxidized by ______ to oxaloacetate in Krebs cycle. (MDCAT 2015)

A. ATP
[✓ B. NAD^+]
C. $NADP^+$
D. FAD

Q.81 In electron transport chain, the electrons from NADH and FADH2 are passed to: (MDCAT 2015)

A. Cytochrome a
B. Co-enzyme c
C. Cytochrome a_3
[✓ D. Co-enzyme Q]

Q.82 Carriers of the respiratory chain are located on: (MDCAT 2015)

A. Matrix of mitochondria
[✓ B. Inner membrane of mitochondria]
C. Outer membrane of mitochondria
D. Cytoplasmic matrix

Q.83 Functional group of chlorophyll 'a' is: (MDCAT 2016)

[✓ A. $-CH_3$]
B. $-COOH$
C. $-CHO$
D. $-OH$

Q.84 Photosystem I has chlorophyll 'a' molecules which absorb maximum light of: (MDCAT 2016)

A. 680 nm
[✓ B. 700 nm]
C. 780 nm
D. 580 nm

Q.85 Cyclic flow of electrons produces: (MDCAT 2016)

A. ATP and CO_2
B. Only CO_2
[✓ C. ATP]
D. Only Oxygen

Q.86 Each ______ consists of a light gathering antenna complex and reaction center. (MDCAT 2016)

A. Chlorophyll
B. Photon
[✓ C. Photosystem]
D. Electron

Q.87 Immediate product formed after CO2 fixation in Calvin Cycle is: (MDCAT 2016)

[✓ A. Unstable 6-carbon compound]
B. Unstable 4-carbon compound
C. Unstable 5-carbon compound
D. Unstable 3-carbon compound

Q.88 Chlorophyll molecule contains: (MDCAT 2017)

[✓ A. Mg^{++}]
B. K^+
C. Ca^{++}
D. Na^+

Q.89 The tail of chlorophyll molecule is embedded in: (MDCAT 2017)

A. Membrane of mitochondria
B. Membrane of SER
[✓ C. Thylakoid membrane]
D. Membrane of RER

Q.90 Chlorophyll 'a' and chlorophyll 'b' differ in one of the functional groups, Chlorophyll 'a' has: (MDCAT 2017)

A. -CHO
[✓ B. $-CH_3$]
C. -OH
D. $-NH_2$

Q.91 Glycerate-3-phosphate in the presence of ATP and reduced NADP from light dependent stage is reduced to: (MDCAT 2017)

[✓ A. 3-carbon compound]
B. 5-carbon compound
C. Ribulose bisphosphate
D. 6-carbon compound

Q.92 Calvin cycle occurs in: (MDCAT 2017)

A. Grana of chloroplast
B. Chlorophyll (Reacon center)
[✓ C. Stroma of chloroplast]
D. Roots of plants

Q.93 Pick the characteristic of tail of chlorophyll: (MDCAT 2017)

A. Hydrophilic
B. Present in stroma
[✓ C. Hydrophobic]
D. $C_{20}H_{20}$

Q.94 **Which of the following color is maximum absorbed by chlorophyll?** **(MDCAT 2017)**
[✓ A. Red] B. Yellow
C. Green D. Indigo

Q.95 **Graph showing effectiveness of absorbed light is called:** **(MDCAT 2017)**
A. Absorption spectrum B. Light spectrum
[✓ C. Action spectrum] D. Dark spectrum

Q.96 **Splitting of water in sunlight is called:** **(MDCAT 2017)**
A. Lysis [✓ B. Photolysis]
C. Condensation D. Hydrolysis

Q.97 **CO2 acceptor in Calvin cycle is:** **(MDCAT 2017)**
A. Rubisco B. RuP
[✓ C. RuBP] D. G_3P

Q.98 **Glycolysis is conversion of:** **(MDCAT 2017)**
A. Glucose to Acetyl Co-A [✓ B. Glucose to pyruvate]
C. Glucose to G3P D. Glucose to Serine

Q.99 **Acceptor of acetyl Co-A in Krebs cycle is:** **(MDCAT 2017)**
[✓ A. Oxaloacetate] B. Succinate
C. Citrate D. Fumarate

Q.100 **2-FADH2 can yield energy:** **(ETEA 2107)**
[✓ A) 4 ATP] B) 8 ATP
C) 6 ATP D) 10 ATP

Q.101 **Pyruvic acid is the end product of:** **(NTS 2017)**
[✓ A. Glycolysis] B. Krebs cycle
C. Oxidation D. ETC

Q.102 **When we extract carotenoids from its source we see that it is:** **(MDCAT 2018)**
A. Violet in colour B. Yellow green in colour
C. Blue green in colour [✓ D. Yellow and orange red in colour]

Q.103 **________ is the site of light independent reaction.** **(MDCAT 2018)**
A. Thylakoid space B. Grana
C. Thylakoid membrane [✓ D. Stroma]

Q.104 **At the last step of glycolysis which of the following compound is formed? (MDCAT 2018)**
A. Fructose phosphate [✓ B. Pyruvic acid/ Pyruvate]
C. Ethyl alcohol D. Lactic acid

Q.105 **The enzymes required in glycolysis are present in:** **(MDCAT 2018)**
A. Golgi apparatus B. Inner mitochondrial membrane
[✓ C. Cell cytoplasm] D. Matrix of mitochondria

Q.106 **In aerobic respiration:** **(MDCAT 2018)**
A. Pyruvate is completely oxidized to form oxygen and water
B. Pyruvate is carboxylated to produce citrate
C. Pyruvate is converted to ethanol and carbon dioxide
[✓ D. Pyruvate is completely oxidized to form carbon dioxide and water]

Q.107 **The enzymes required for Krebs cycle are found in ________.** **(MDCAT 2018)**
A. Lysosomes B. Cytoplasm
[✓ C. Matrix] D. F_1 particles

Q.108 The following statement is true for the absorption spectra of photosynthesis: **(ETEA 2018)**

A. Chlorophyll ‘a’ and ‘b’ have same absorption spectra
[✓ B. Chlorophyll ‘a’ and ‘b’ have different absorption spectra]
C. Chlorophyll ‘a’ and carotenoids have same absorption spectra
D. Carotenoids and chlorophyll ‘b’ have to same absorption spectra

Q.109 Which part of the cell does glycolysis occur in? **(NTS 2018)**

A. Mitochondria
B. Chloroplast
C. Nucleus
[✓ D. Cytoplasm]

Q.110 CO2 joins the photosynthesis at: **(NTS 2018)**

A. Light reaction
[✓ B. Dark reaction]
C. PS-II
D. PS-I

Q.111 The complete aerobic oxidation of glucose results in the synthesis of as many as ______ molecules of ATP. **(NTS 2018)**

A. 16
B. 26
[✓ C. 36]
D. 46

Q.112 The photosynthetic pigments of plants are arranged as clusters in thylakoid membranes. The reaction centers of these clusters consist of ________ molecules. **(MDCAT 2019)**

A. ATP
B. Glucose
[✓ C. Chlorophyll]
D. Carotenoids

Q.113 Which of the following photosystem is involved in cyclic photophosphorylation? **(MDCAT 2019)**

A. PS I and PS II
B. PS III
C. PS II
[✓ D. PS I]

Q.114 In chemiosmosis, the proton (H+) pumps moves from ________. **(MDCAT 2019)**

[✓ A. Stroma to Lumen]
B. Lumen to Stroma
C. Stroma to cytoplasm
D. Cytoplasm to Stroma

Q.115 Glycolysis takes place in the ________ of cell. **(MDCAT 2019)**

A. Golgi complex
[✓ B. Cytoplasm]
C. Nucleus
D. Mitochondria

Q.116 How many molecules of ATP would be utilized for phosphorylation of one glucose molecule during glycolysis? **(MDCAT 2019)**

A. One
[✓ B. Two]
C. Four
D. Three

Q.117 Which of the following atom is present in the centre of a chlorophyll molecule? **(AJK 2019)**

A. Manganese
[✓ B. Magnesium]
C. Chlorine
D. Iron

Q.118 In cyclic photophosphorylation, the products are: **(AJK 2019)**

A. FADH
[✓ B. ATP]
C. ATP & NADPH
D. NADPH

Q.119 The end product of glycolysis is: **(AJK 2019)**

A. Fructose 6 phosphate
B. Succinate
[✓ C. Pyruvic acid/ Pyruvate]
D. Oxaloacetate

Q.120 Organization of photosynthetic pigments into clusters is: **(AJK 2019)**

A. Photosynthesis
[✓ B. Photosystem]
C. Photosynthetic cluster arrangement
D. Calvin system

Q.121 **Plant pigments responsible for red, yellow and orange colors in many fruits and vegetables are:** **(NTS 2019)**
A. Chlorophyll A
B. Chlorophyll B
[✓ C. Carotenoids]
D. Cellulose

(PMC 2020)

Q.122 **First stable compound during Calvin Cycle is:**
[✓ A. 3-Phosphoglycerate]
B. 1, 3 - Bisphosphoglycerate
C. Glyceraldehyde 3 – Phosphate
D. Ribulose bisphosphate

(PMC 2020)

Q.123 **What is the function of ribulose?**
[✓ A. Intermediates in photosynthesis]
B. Intermediates in cellular respiration
C. Respiratory fuel
D. Component of DNA and RNA

Q.124 **Which of the following processes does not need pyruvic acid as a substrate?** **(PMC 2020)**
A. Alcoholic fermentation
B. Aerobic respiration
[✓ C. Calvin cycle]
D. Lactic acid fermentation

Q.125 **Which of the following is a copper containing protein in electron transport chain?** **(PMC 2020)**
A. Plastoquinone
[✓ B. Plastocyanin]
C. Cytochrome C
D. Ferredoxin

Q.126 **In electron transport chain, ATP synthesis takes place when electrons move from:** **(PMC 2020)**
A. Primary electron acceptor to plastoquinone
B. Plastoquinone to cytochromes
[✓ C. Cytochrome to plastocyanin]
D. Plastocyanin to photosystem

Q.127 **The end product of glycolysis in anaerobic respiration is:** **(PMC 2020)**
A. Ethanol and carbon dioxide
[✓ B. Pyruvate]
C. Lactate
D. Acetyl Co A

Q.128 **Photophosphorylation takes place in the ________of the chloroplast.** **(PMC 2020)**
A. Stroma
B. Inner membrane
[✓ C. Granum]
D. Outer membrane

ANSWER KEY

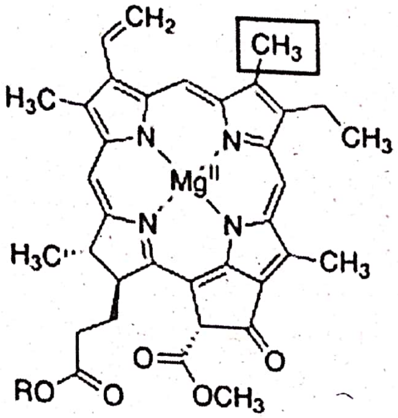
TOPIC-WISE MCQs & PAST PAPER MCQs

1	D	16	D	31	C	46	A	61	D	76	C	91	A	106	D	121	C
2	B	17	C	32	C	47	B	62	C	77	B	92	C	107	C	122	A
3	D	18	B	33	A	48	B	63	D	78	A	93	C	108	B	123	A
4	A	19	D	34	C	49	B	64	A	79	B	94	A	109	D	124	C
5	A	20	B	35	A	50	C	65	B	80	B	95	C	110	B	125	B
6	D	21	A	36	A	51	D	66	C	81	D	96	B	111	C	126	C
7	B	22	A	37	C	52	C	67	A	82	B	97	C	112	C	127	B
8	D	23	C	38	C	53	A	68	B	83	A	98	B	113	D	128	C
9	A	24	C	39	D	54	A	69	A	84	B	99	A	114	A		
10	D	25	B	40	A	55	D	70	A	85	C	100	A	115	B		
11	B	26	C	41	A	56	D	71	C	86	C	101	A	116	B		
12	D	27	C	42	D	57	C	72	B	87	A	102	D	117	B		
13	D	28	A	43	B	58	D	73	A	88	A	103	D	118	B		
14	A	29	B	44	B	59	C	74	A	89	C	104	B	119	C		
15	A	30	D	45	C	60	A	75	B	90	B	105	C	120	B		

EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

1. Spectrophotometer is an electrical instrument, which is used to measure the relative abilities of different pigments to absorb different wavelengths of light.
2. A graph plotting absorption of light of different wavelengths by a pigment is called absorption spectrum while the graph showing relative effectiveness of different wavelengths of light in driving photosynthesis is called action spectrum.
3. Carotenoids are yellow and red to orange pigments that absorb strongly the blue-violet range, different wavelengths than the chlorophyll absorbs, so they broaden the spectrum of light that provide energy for photosynthesis.
4. Carbon dioxide fixation in dark reaction is carried out by the enzyme ribulose bisphosphate carboxylase, also known as Rubisco. It is the most abundant protein in chloroplasts, and probably the most abundant protein on earth.
5.



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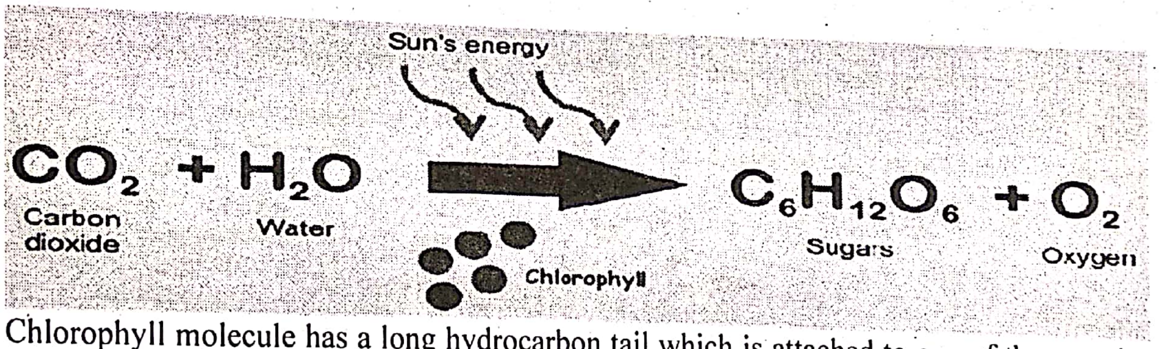
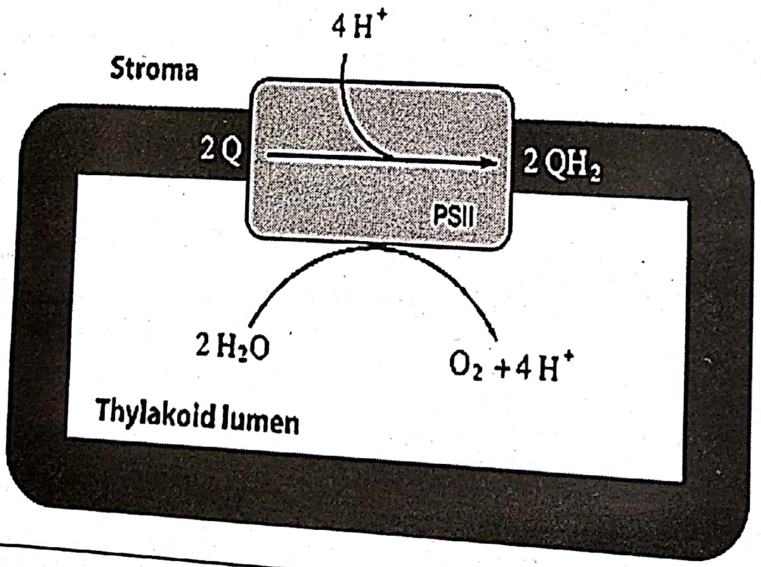


7. Chlorophyll molecule has a long hydrocarbon tail which is attached to one of the pyrrole rings of chlorophyll molecules and is embedded in the hydrophobic core thylakoid membrane
8. Photosystem II is involved in photolysis of water as result oxygen is evolved) If photosystem II is absent in an organism oxygen will be not liberate
9. Transfer of energy, broadening the spectrum and protection of chlorophyll molecules and eyes are the functions of carotenoids. The conversion of light energy into chemical energy is the function of chlorophyll molecules.
10. A chlorophyll molecule has two main parts; one flat, light absorbing hydrophilic head and the other long, anchoring, hydrophobic hydrocarbon tail. The head is complex porphyrin ring which is made up of four joined smaller pyrrole rings

11. Carotenoids and chlorophyll 'b' are called accessory pigments because they absorb light and transfer the energy to chlorophyll a, which then initiates the light reactions. It is generally believed that the order of transfer of energy is.
12. Light dependent phase of photosynthesis takes place in grana of chloroplast in which light energy is converted chemical energy.
13. The antenna complex has many molecules of chlorophyll 'a', chlorophyll 'b' and carotenoids, most of them channeling the energy to reaction center. Reaction center has one or more molecules of chlorophyll 'a' along with primary electron acceptors, and associated electron carries of ETC.
14. The source of oxygen released during photosynthesis is water. This was confirmed by scientists Van Niel during 1940s when first use of an isotopic tracer (O^{18}) in biological research was made.
15. Using evidence from bacteria that utilize hydrogen sulfide (H_2S) for photosynthesis, van Niel hypothesized that all photosynthetic organisms need a hydrogen source and that plants split water as their hydrogen source, releasing oxygen. Scientists confirmed this hypothesis by using a heavy isotope of oxygen (^{18}O).
16. Photosynthesis is the biochemical process that occurs during day time and requires chlorophyll for sugar synthesis and uses CO_2 as reactant. O_2, however, is produced as by-product during light dependent phase of photosynthesis and consumed during cellular respiration.
17. Z-scheme is another name use for light dependent reaction of photosynthesis.
18. The light reactions of photosynthesis take place at thylakoid membrane while dark reactions take place in stroma of chloroplast.
19. $NADP^+$ acts as the final electron acceptor during non-cyclic electron flow, while electrons are moved back from ferredoxin to cytochrome complex to generate assimilating power via cyclic electron flow.
20. Photosynthetic pigments are organized into clusters, called photosystems. There are two photosystems found in plants, PS-I and PS-II. These are named so in order of their discovery.
21. Each photon of light is able to excite a single electron during light reactions of photosynthesis.
22.



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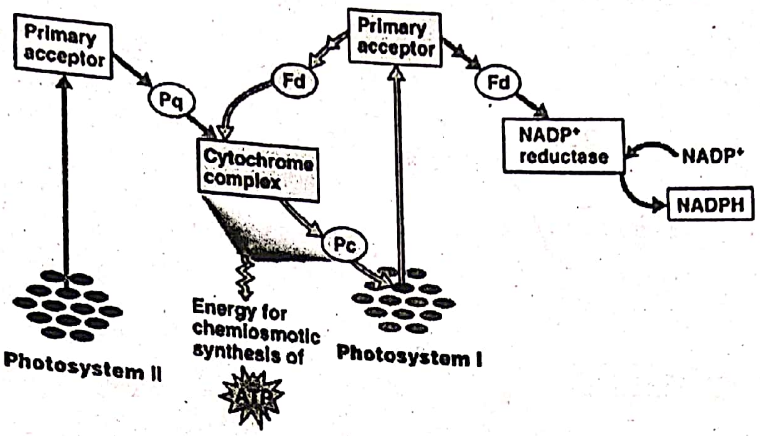
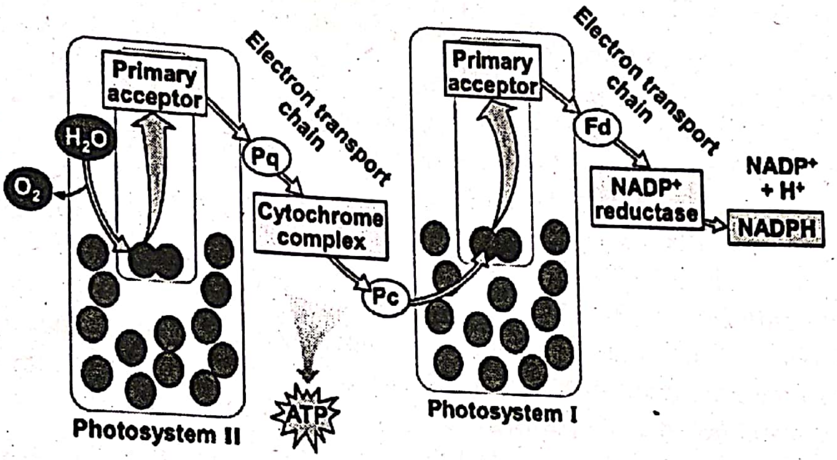
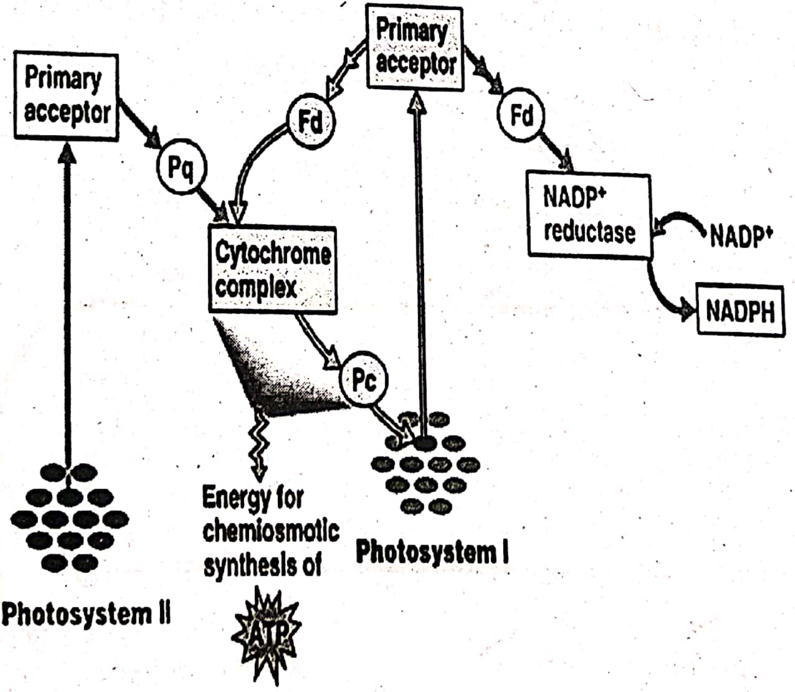


24, 25 and 26.



27 and 28.



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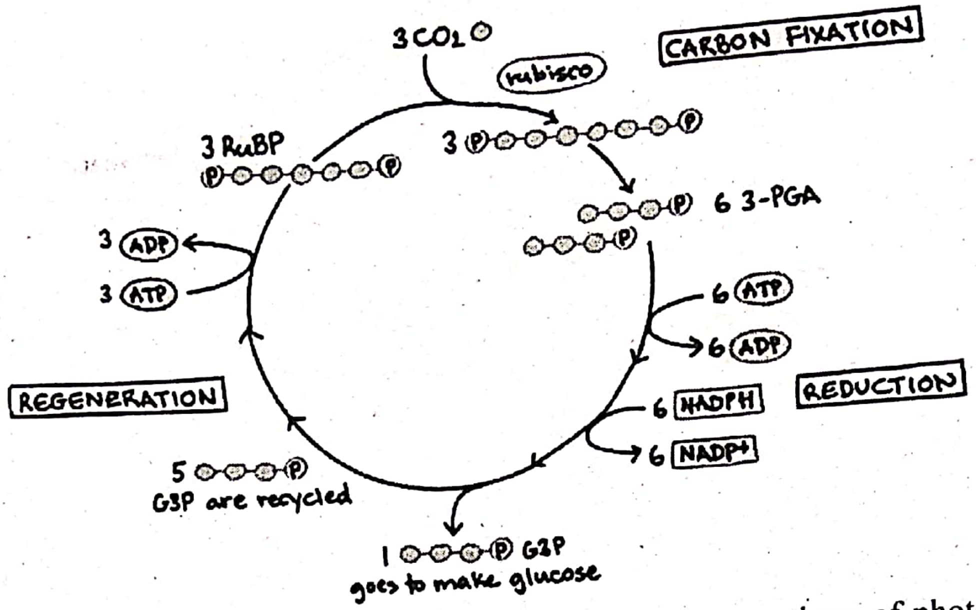


30. Carbon dioxide fixation does not take place in light dependent phase of photosynthesis; rather its fixation occurs in light independent phase of photosynthesis.

31. The production of ATP and O2 as by product is associated with light reactions while CO2 fixation is associated with dark reactions.

32. ATP and NADPH are the products of light dependent reaction of photosynthesis, while PEP produce during glycolysis.

33. Since 6 molecules of NADPH are used for the synthesis of 1 G_3P in Calvin cycle, so for the synthesis of one glucose molecule 12 molecules of NADPH are required.

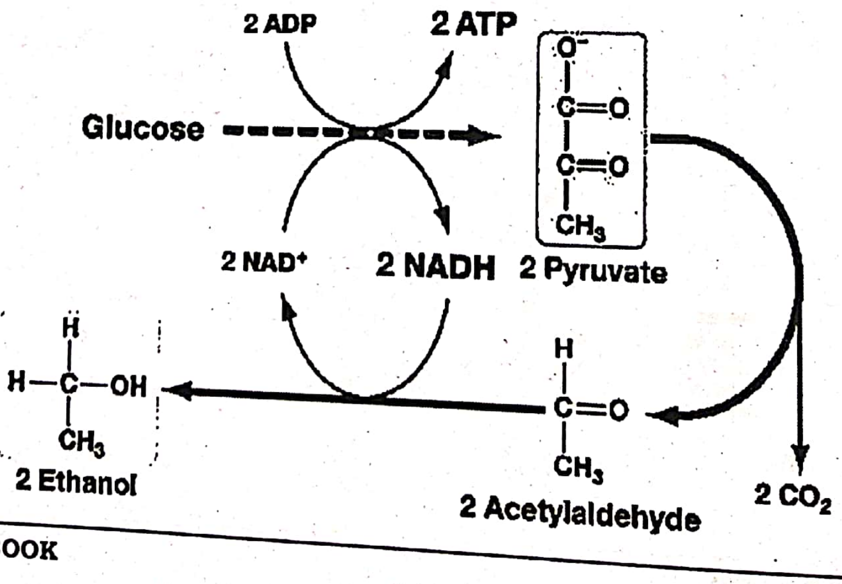
34. Because the product of initial carbon fixation is a three - carbon compound, the Calvin cycle is also known as C_3 pathway.

35. The chemical equation of dark reaction is:

$$3CO_2 + 6NADPH + 9ATP \longrightarrow (CH_2O)_3 + 6NAPD + 9ADP + 9Pi + 3H_2O$$

(Carbohydrate)

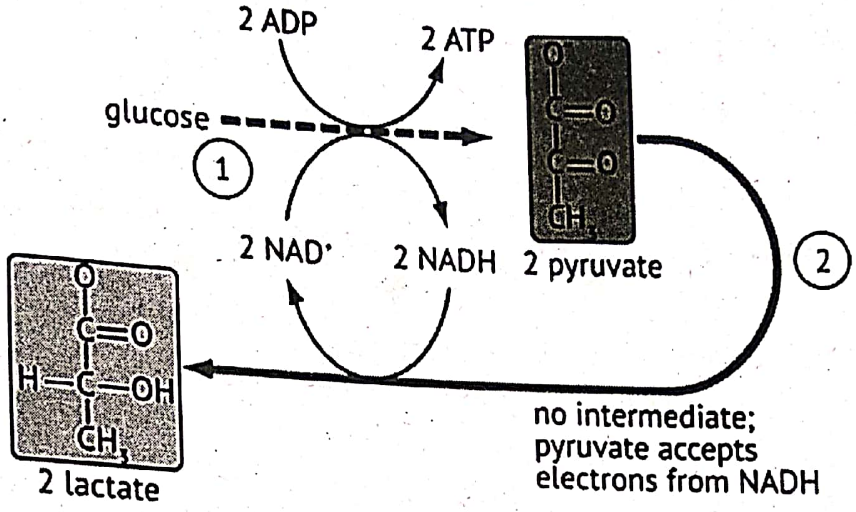
36.



37. Only about 2% of the energy present within the chemical bonds of glucose in converted into ATP during anaerobic respiration/fermentation.

38. CO_2 is not produced during glycolysis and chemiosmosis while it is being consumed in Calvin cycle. During alcoholic fermentation, pyruvate molecules are decarboxylated to form acetaldehyde which is then reduced to ethanol.

39.



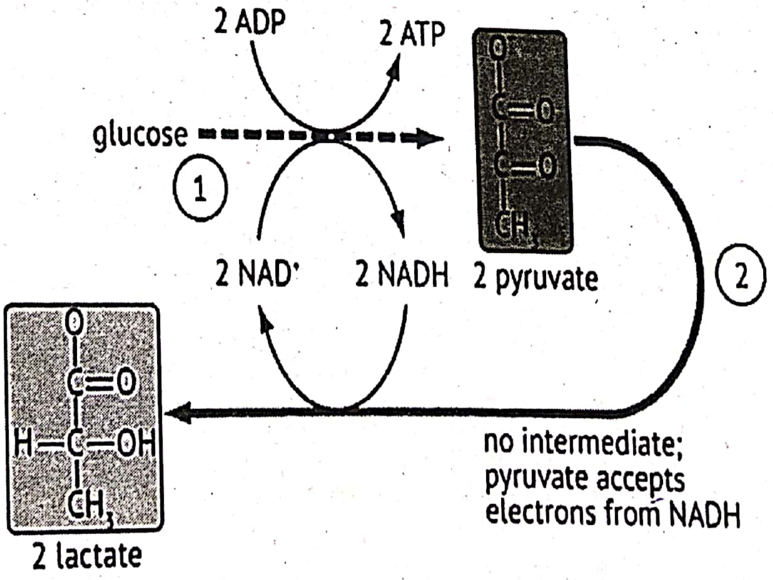
40. Cellular respiration is essentially an oxidation process while photosynthesis is essentially a reduction process.

41. RBCs are unable to carry put oxidative phosphorylation because they lack mitochondria. Oxyntic cells, neurons and cardiac muscle cells are able to produce ATP molecules through oxidative phosphorylation because they have mitochondria.

42. Combustion is not a multistep reaction, enzyme controlled and intracellular. All these are the characteristics related to cellular respiration.

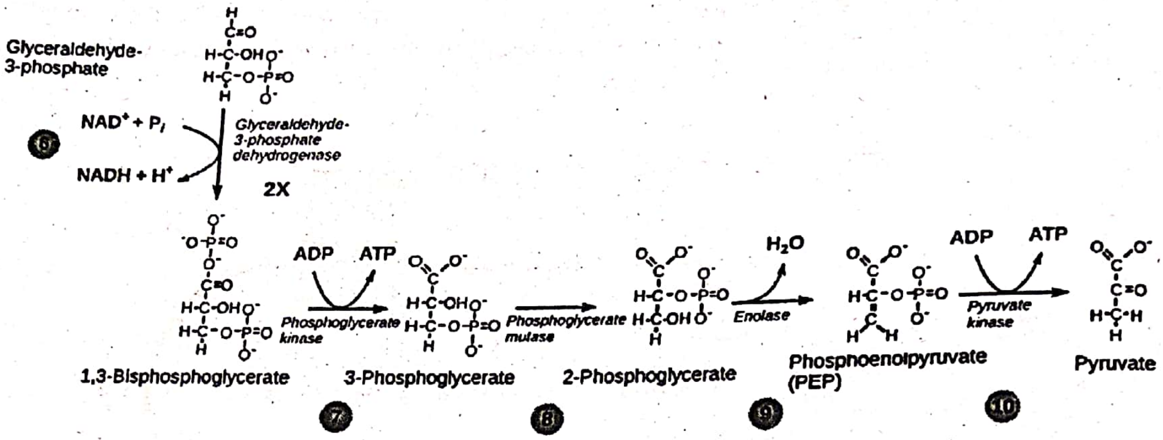
43. Energy is released during cellular respiration by catabolism of organic molecules in all organisms.

44.



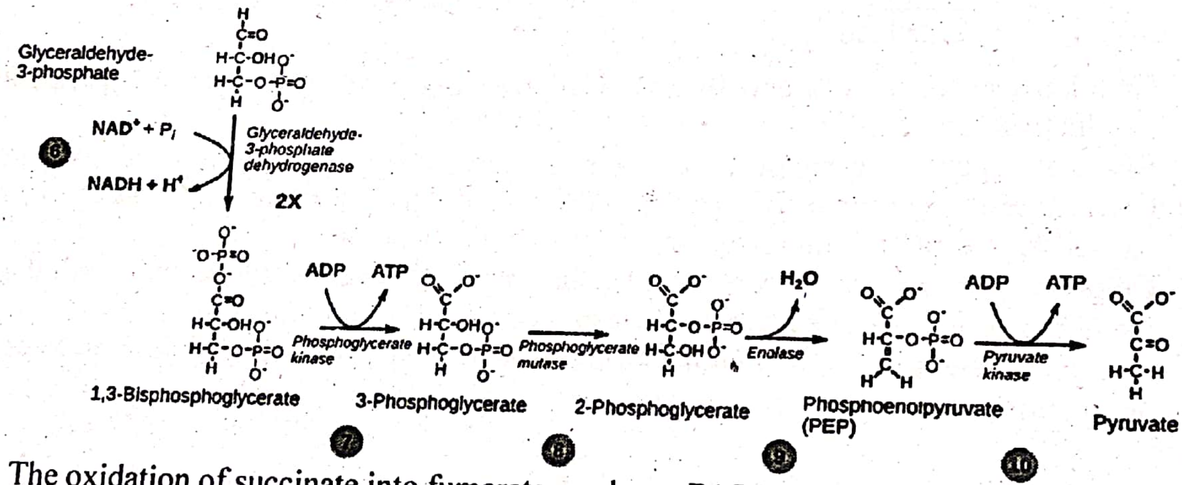
45. During fermentation of lactic acid, NADH is oxidized to regenerate NAD^+.

46.



47. Removal of phosphate group from a molecule is called de-phosphorylation. Conversion of fructose 1,3-bisphosphoglycerate into 3-phosphoglycerate is a de-phosphorylation reaction.

48.

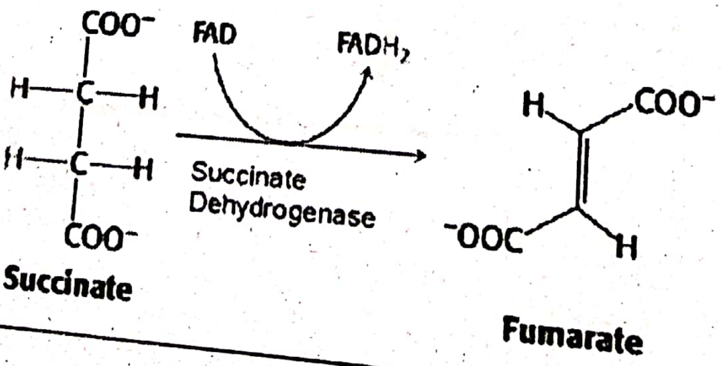


49. The oxidation of succinate into fumarate produces $FADH_2$.This reaction is catalyzed by an enzyme called succinic acid dehydrogenase.

50. The cyclic reactions of Krebs cycle produce both NADH and $FADH_2$, while in glycolysis, only NADH is produced During electron transport chain, these NADH and $FADH_2$ molecules are oxidized to produce ATP molecules.

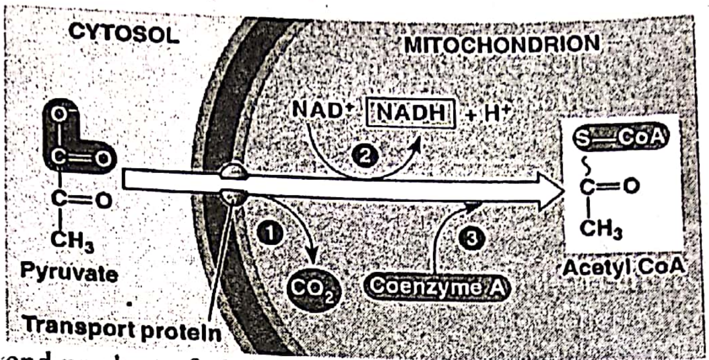
51. When products of glycolysis pass through Krebs cycle, it will produce 6 molecules of NADH, 2 molecules of $FADH_2$ and 2 molecules of ATP.

52.



53. Theoretically, one NADH molecule generates 3ATP molecules while one $FADH_2$ generates 2 ATP molecules during their oxidation through electron transport chain.

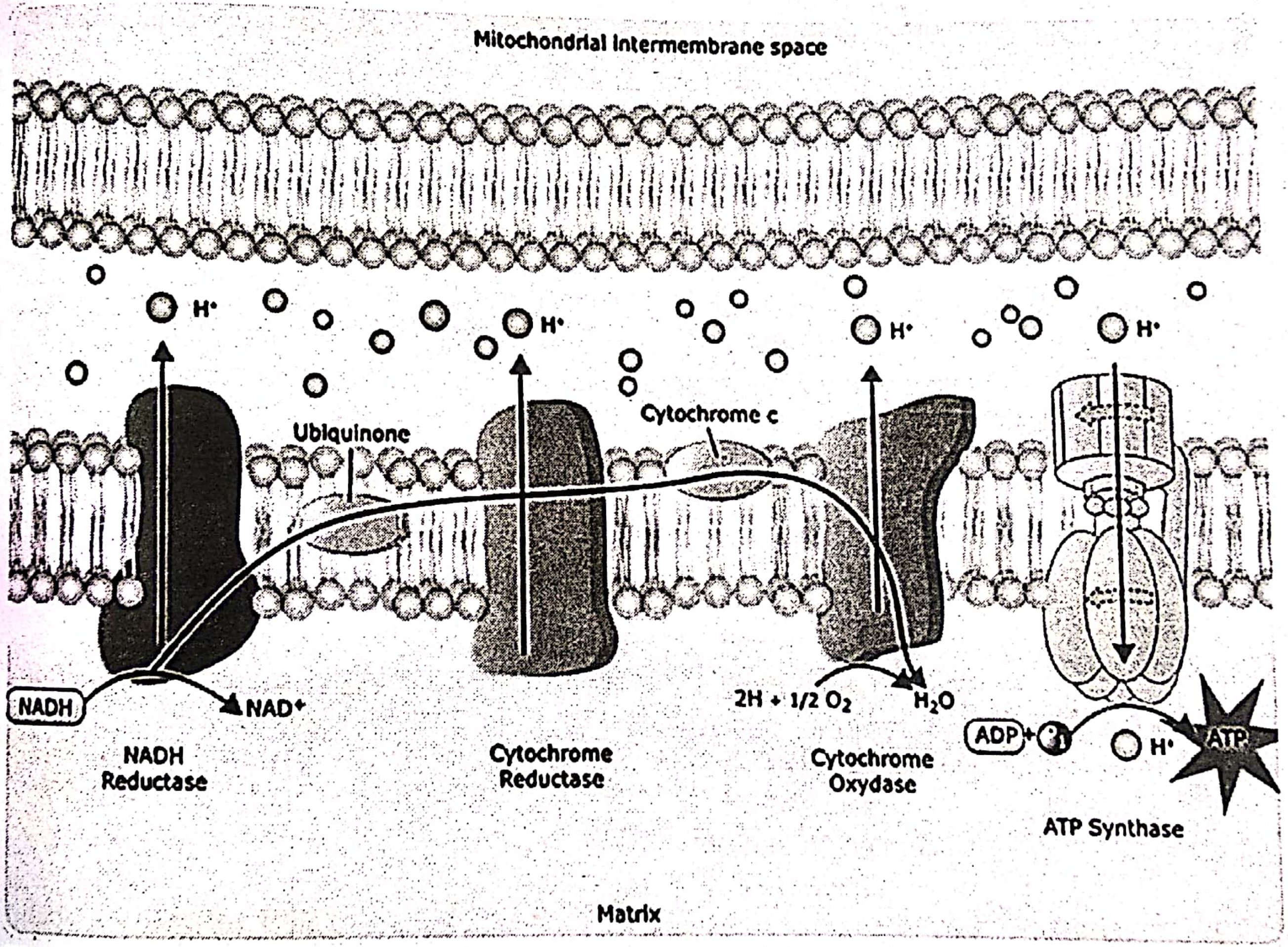
54.



55. Starting from end product of glycolysis, 3 times decarboxylation occurs. It means 3 molecules of CO_2 produced.

56. When pyruvate molecule is converted into acetyl CoA, one carbon of pyruvate is removed in the form of carbon dioxide (decarboxylation) along with hydrogen (dehydrogenation) that is added to NADH.

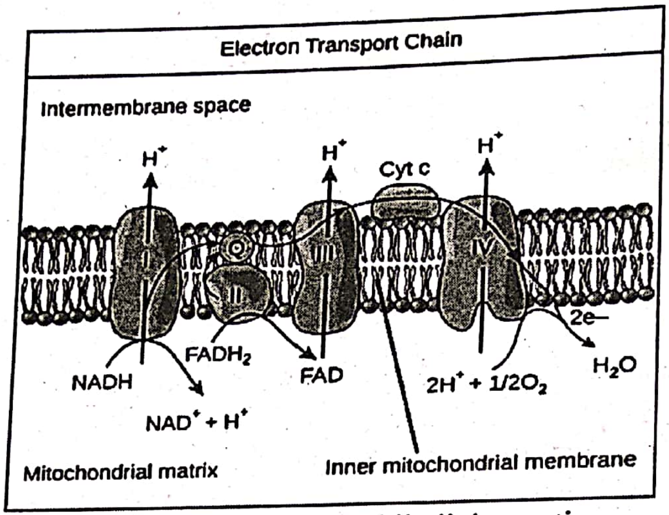
57.



58. Passage of electrons between donor and acceptor in ETC releases energy, which is used to generate a proton gradient across the mitochondrial membrane by actively "pumping" protons into the inter-membrane space, producing a thermodynamic state that has the potential to do work.

59. Biological oxidation involves the removal of hydrogen, a redox reaction catalyzed by the dehydrogenases, linked to a specific coenzyme.

60.



61. Glycolysis produces 2 net ATP molecules, while link reaction produces only two NADH molecules. Krebs cycle produces 2 ATP molecules, 6 NADH and 2 $FADH_2$ molecules. These reduced electron carriers are then oxidized via ETC to generate maximum ATP molecules through chemiosmosis.

62. Phosphofructokinase is the main regulatory enzyme in preparatory phase of glycolysis and it is inhibited by the increased concentration of NADH.

63. The ATP molecules are produced during glycolysis via substrate level phosphorylation in cytosol while oxidative phosphorylation is associated with mitochondria. Photophosphorylation is the process of utilizing light energy from photosynthesis to convert ADP to ATP and is associated with chloroplasts.

64. Cellular respiration is a process in which energy is released in the form of ATP due to catabolism of organic substance.

65. Total 40 ATP molecules are produced due to aerobic breakdown of glucose in both prokaryotes and eukaryotes. In prokaryotes 2 ATP are utilized in preparatory phase of glycolysis, so net ATP production is 38.

66. Chemiosmosis is the movement of ions across a semi-permeable membrane, down their electrochemical gradient. An example of this would be the generation of ATP by the movement of H^+ across a membrane during cellular respiration or photosynthesis

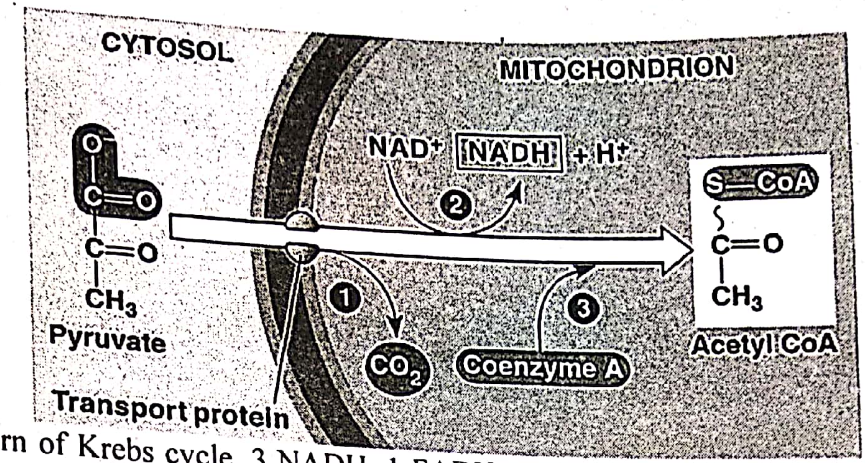
67. The most common fuel used by the cell to provide energy by cellular respiration is glucose. The way glucose is metabolized depends on the availability of oxygen. Prior to entering a mitochondrion, the glucose molecule is split to form two molecules of pyruvic acid.

68. Oxidative phase of glycolysis starts when Two electrons or two hydrogen atoms are removed from the molecule of 3-phosphoglyceraldehyde and transferred to a molecule of NAD^+. This is of course, an oxidation-reduction reaction, with the PGAL being oxidized and the NAD^+ being reduced.

69. During glycolysis glucose molecule is split to form two molecules of pyruvic acid Glycolysis is a common step in both aerobic and anaerobic respiration.

70. Pyruvic acid oxidation takes place in mitochondria. Firstly, carbon dioxide is removed from pyruvic acid during this process as a result two carbon compound acetic acid is formed which join with coenzyme A to form acetyl coenzyme A.

71.



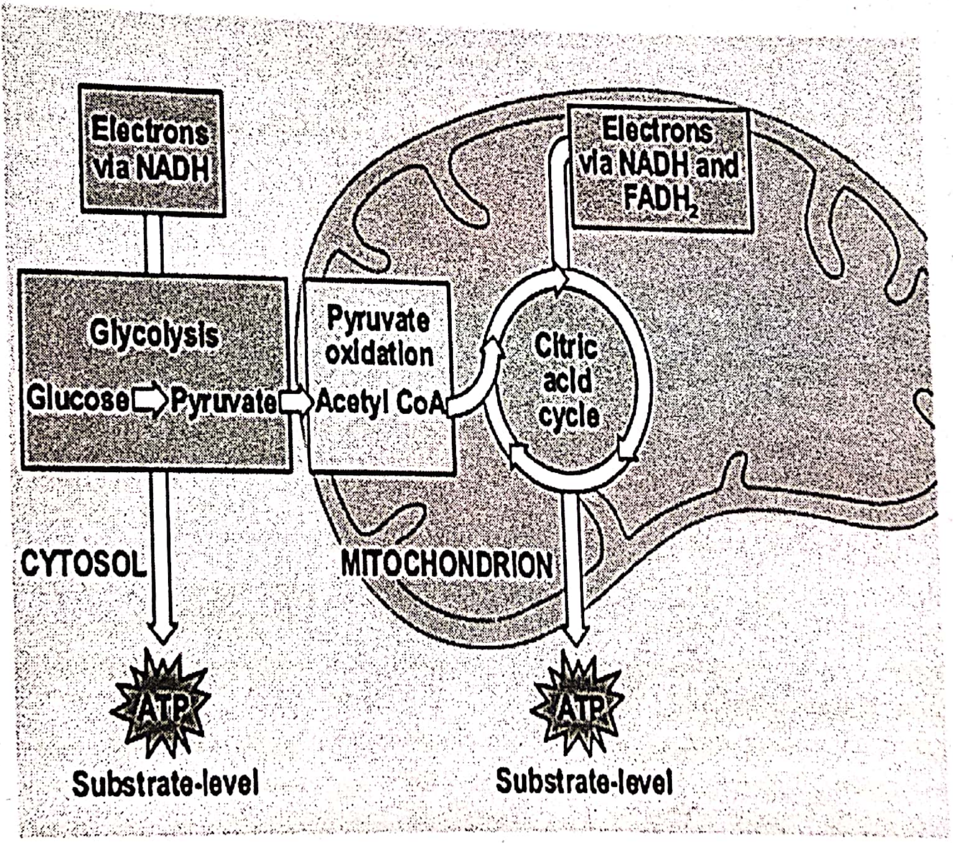
72. In one turn of Krebs cycle, 3 NADH, 1 $FADH_2$ and 1 ATP molecule is produced from acetyl coenzyme A when it is oxidized.

73. ATP formation in the presence of oxygen is called oxidative phosphorylation. ETC is responsible for this which is present take at cristae.

74. Yogurt is a popular fermented dairy product produced by lactic acid bacteria, including *Streptococcus thermophilus* and *Lactobacillus*. During yogurt production, these bacteria produce lactic acid, decreasing pH and causing milk protein to coagulate.

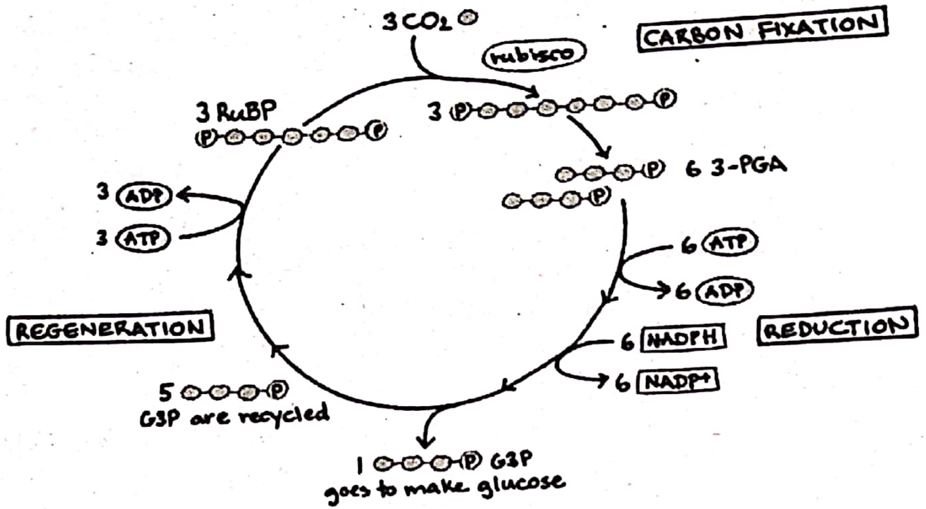
75. An autotroph is an organism that can produce its own food using light, water, carbon dioxide, or other chemicals. Because autotrophs produce their own food, they are sometimes called producers.

76.



77. During light dependent phase of photosynthesis ATP and NADPH form, which use in light independent phase of photosynthesis.

78.



79. The oxidation of PGAL is an energy yielding process. Thus a "high energy" phosphate bond is created in this molecule. At the very next step in glycolysis this phosphate group is transferred to a molecule of ADP converting it into ATP. The end product of this reaction is 3PG.

80. NAD$^+$ mediated oxidation of malate produces oxaloacetate, the original 4-carbon molecule.

81. NADH and FADH$_2$ are oxidized by coenzyme 'Q' in electron transport chain. This oxidation yields enough free energy to permit the synthesis of a molecule of ATP from ADP and inorganic phosphate.

82. Carriers of electron transport chain are located on cristae and these carriers are involving in ATP formation by the process of chemiosmosis.

83. Functional group of chlorophyll 'a' is -CH$_3$ while functional group of chlorophyll 'b' is -CHO.

84. Chlorophyll 'a' itself exists in several forms differing slightly in their red absorbing peaks e.g. at 670,680, 690, 700 nm. Chlorophyll 'a' of photosystem I absorbs 700nm and Chlorophyll 'a' of photosystem II absorb light of 680 nm.

85. During non-cyclic phosphorylation ATP and NADPH are produced while during cyclic flow of electron only ATP is produced.

86. Each photosystem consists of a light-gathering 'antenna complex' and a 'reaction center'. The antenna complex has many molecules of chlorophyll 'a', chlorophyll 'b' and carotenoids, most of them channeling the energy to reaction center. Reaction center has one or more molecules of chlorophyll 'a' along with a primary electron acceptor, and associated electron carriers of 'electron transport system'.

87. The Calvin cycle begins when a molecule of CO$_2$ reacts with a highly reactive phosphorylated five carbon sugar named RuBP. The product of this reaction is a highly unstable, six carbons intermediate that immediately breaks into two molecules of three carbon compound called 3-PGA.

88. An atom of magnesium is present in the center of porphyrin ring and is coordinated with the nitrogen of each pyrrole ring. That is why magnesium deficiency causes yellowing in plants. Haem portion of haemoglobin is also a porphyrin ring but containing an iron atom instead of magnesium atom in the center.

89. A chlorophyll molecule has two main parts: One flat, square, light absorbing hydrophilic head and the other long, anchoring, hydrophobic hydrocarbon tail. The chlorophyll molecule is embedded in the hydrophobic core of thylakoid membrane by this tail.

90. Functional group of chlorophyll 'a' is $-CH_3$ while functional group of chlorophyll 'b' is -CHO.

91. In Calvin cycle reduction phase, 1, 3 bisphosphoglycerate is reduced to glyceraldehyde 3-phosphate(G_3P) by receiving a pair of electrons donated from NADPH of light reactions. G3P is the same three-carbon sugar which is formed in glycolysis.

92. Light reactions take place in/on thylakoid membrane while dark reaction occurs at stroma of chloroplasts.

93. Chlorophyll molecule has long, anchoring, hydrophobic hydrocarbon tail which is called phytol. The chlorophyll molecule is embedded in the hydrophobic core of thylakoid membrane by this tail.

94. Chlorophylls absorb mainly violet-blue and orange-red wave lengths. Green, yellow and indigo wave lengths are least absorbed by chlorophylls and are transmitted or reflected, although the yellow are often masked by darker green color.

95. A graph plotting absorption of light of different wavelengths by a pigment is called absorption spectrum while graph showing relative effectiveness of different wavelengths of light in driving photosynthesis is called action spectrum.

96. During non-cyclic phosphorylation water molecules splits into two hydrogen ions and an oxygen atom, which immediately combine with another oxygen atom to form O_2. This water splitting step of photosynthesis that releases oxygen is called photolysis. The oxygen produced during photolysis is the main source of replenishment of atmospheric oxygen.

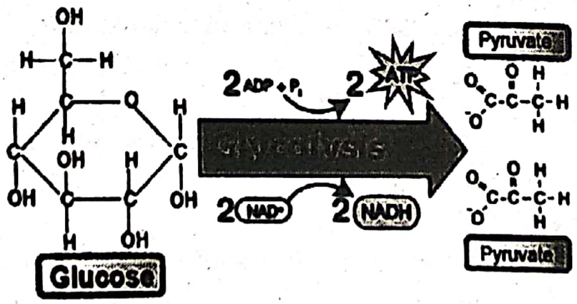
97. The Calvin cycle begins when a molecule of CO_2 reacts with a highly reactive phosphorylated five carbon sugar named ribulose bisphosphate (RuBP). This reaction is catalyzed by the enzyme ribulose bisphosphate carboxylase, also known as Rubisco.

98. Glycolysis is the breakdown of glucose up to the formation of pyruvic acid. Glycolysis can take place both in the absence of oxygen (anaerobic condition) or in the presence of oxygen (aerobic condition).

99. The first step in the Krebs cycle is the union of acetyl CoA with oxaloacetate to form citrate. In this process, a molecule of CoA is regenerated and one molecule of water is use Oxaloacetate is a 4-carbon acid and citrate thus has 6 carbon atoms.

100. 2 FADH2 =2ATP
3 NADH=3ATP

101.



102. Carotenoids are yellow and red to orange pigments that absorb strongly the blue violet range, different wave lengths than the chlorophyll absorbs.

103. Light reactions take place in thylakoid membrane while dark reaction occurs at stroma

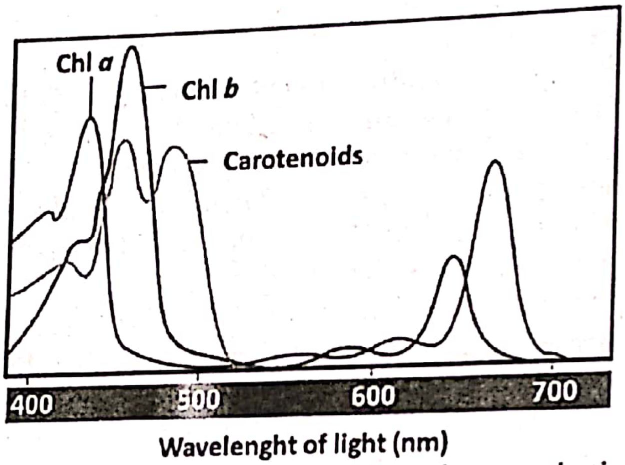
104. Glycolysis is the breakdown of glucose upto the formation of pyruvic acid. Glycolysis can take place both in the absence of oxygen (anaerobic condition) or in the presence of oxygen (aerobic condition).

105. The enzymes required for glycolysis are present in cytoplasm of the cell while enzymes required for pyruvic acid oxidation and Krebs cycle are present in mitochondrial matrix.

106. The complete breakdown of glucose molecule occurs only in the presence of oxygen, i.e. in aerobic respiration. During aerobic respiration glucose is oxidized to CO_2 and water and energy is released.

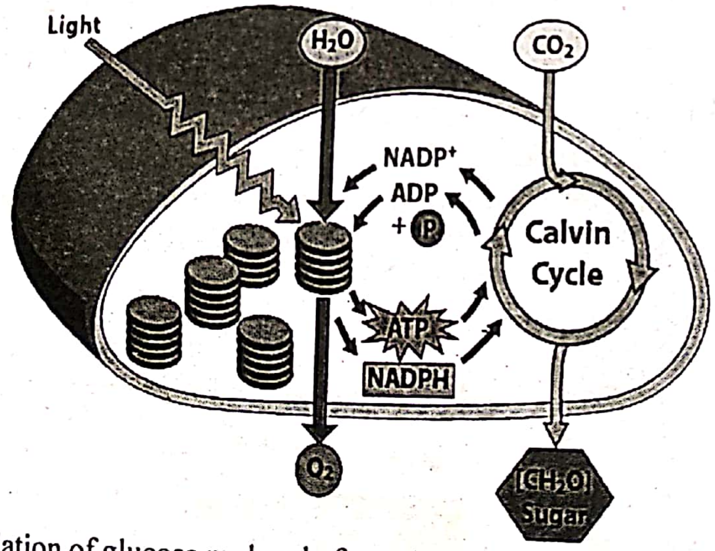
107. The enzymes required for glycolysis are present in cytoplasm of the cell while enzymes required for pyruvic acid oxidation and Krebs cycle are present in mitochondrial matrix.

108.



109. Glycolysis occur in cell cytoplasm. In chloroplast photosynthetic reactions occur to form sugar molecules. Mitochondria involve in aerobic respiration.

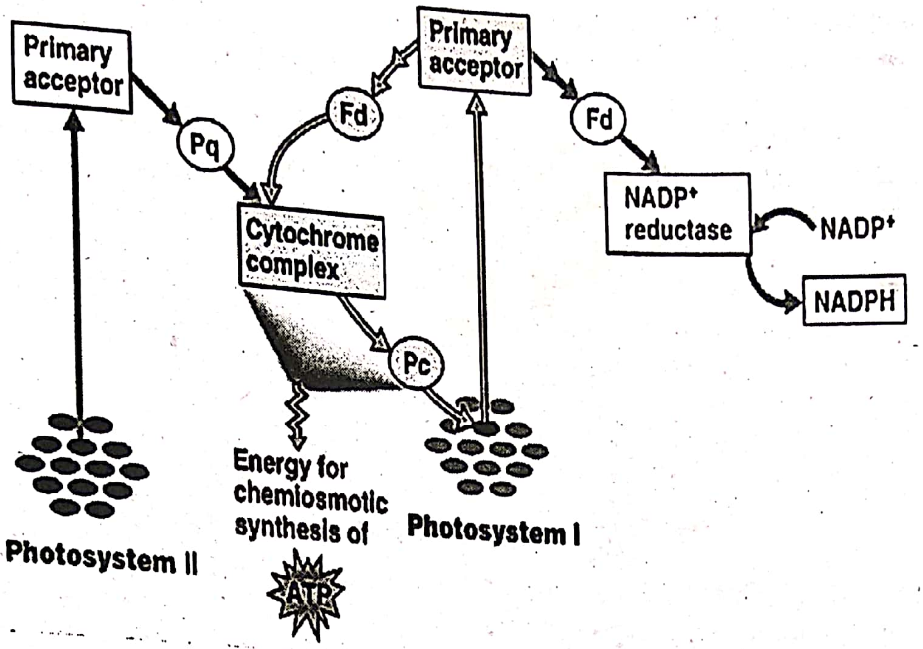
110.



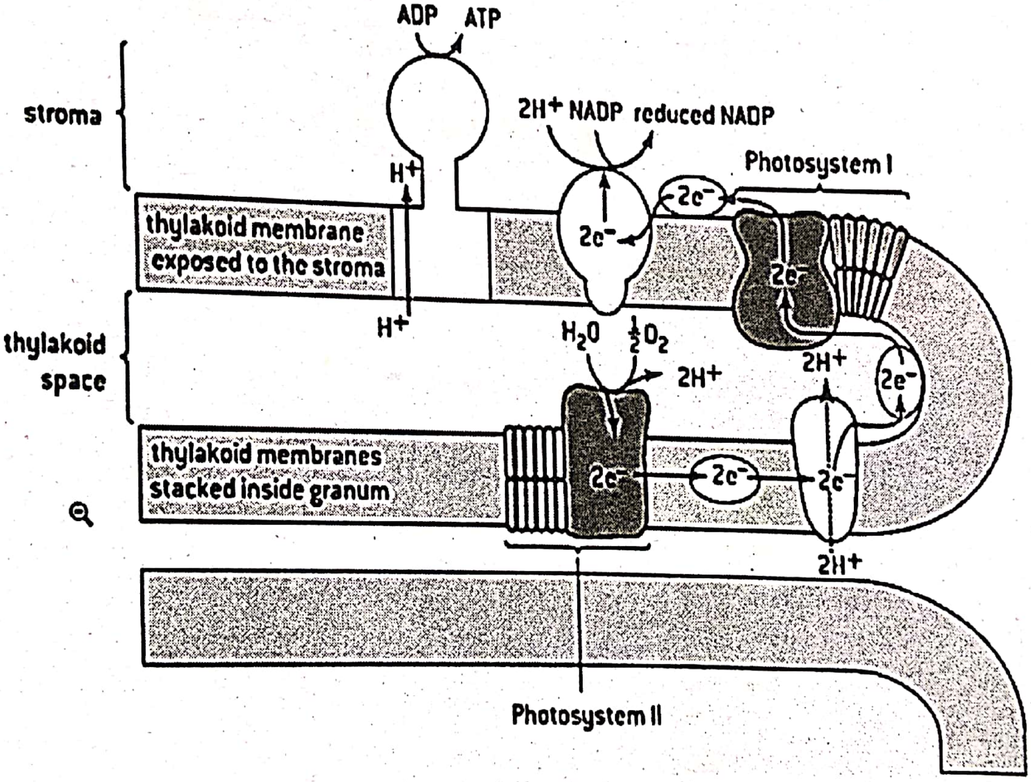
111. Complete oxidation of glucose molecule form 40 ATPs, out of which in eukaryotes 4ATPs consumed.

112. Reaction center of photosystem has one or more molecules of chlorophyll 'a' along with a primary electron acceptor, and associated electron carriers of 'electron transport system'.

113.



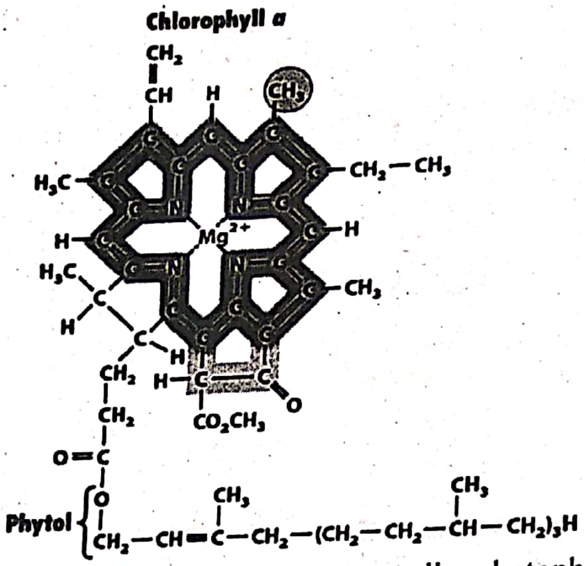
114.



115. Glycolysis is take place in cytoplasm while Krebs cycle takes place in mitochondrial matrix. Golgi complex is associated with various functions like modification and packaging o biological molecules.

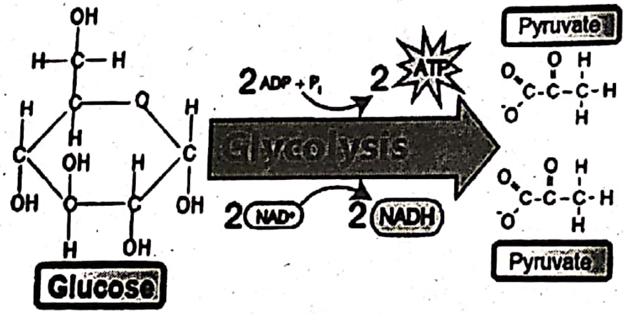
116. During glycolysis two molecule of ATP are used during preparatory phase while four molecule of ATP are produced during oxidative phase.

117.

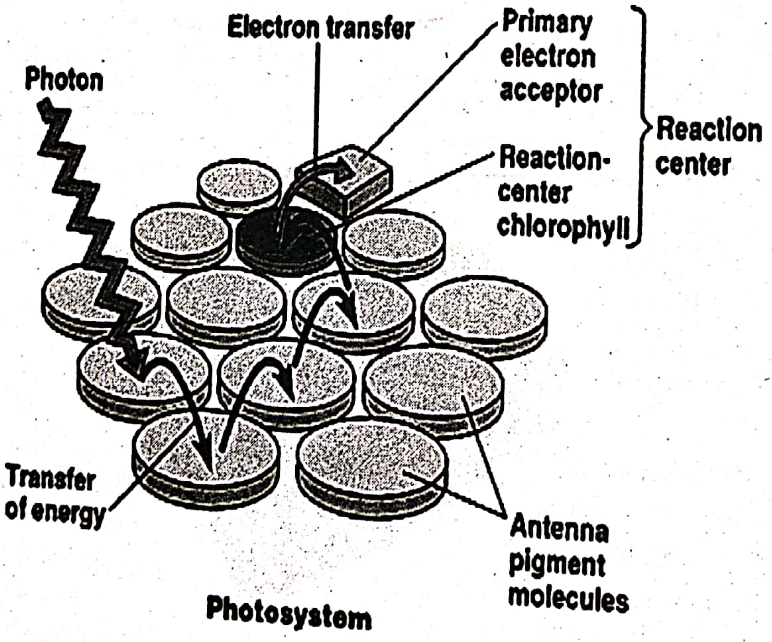


118. ATP and NADPH are the products of non-cyclic photophosphorylation. In cyclic phosphorylation only ATP will form.

119.



120.


Electron transfer
Photon
Primary electron acceptor
Reaction-center chlorophyll
Reaction center
Transfer of energy
Antenna pigment molecules
Photosystem

121. Carotenoids are the accessary photosynthetic pigment in plants which gives red, yellow and orange colors.

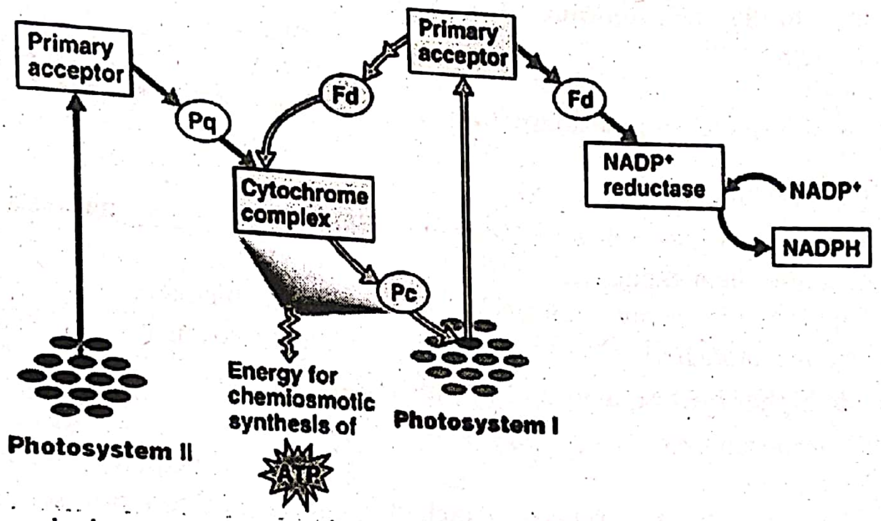
122. Three molecules of $CO_2$are required to make trios during one Calvin cycle. 5 carbon sugar which is RuBP reacts with $CO_2$and make six carbon compounds that immediately brakes and is converted into three carbon compounds which is 3-Phosphoglycerate.

123. Ribulose diphosphate (RuBP) is an intermediate compound during dark reaction of photosynthesis.

124. Pyruvic acid is an intermediate compound during respiration which is concerted into alcohol and lactic acid in alcoholic and lactic acid fermentation respectively. Pyruvic acid is intermediate compound during aerobic respiration also.

125. Plastocyanin is a copper containing protein which is present in electron transport chain during photophosphorylation.

126.



127. During glycolysis partial oxidation of glucose is taken place due to which one molecule of glucose is converted into two molecules of pyruvate that can be converted into ethanol and carbon dioxide or lactic acid.

128. Photosynthetic pigments are present in membrane of thylakoids so photophosphorylation takes place at granum.

3
TOPIC
BIOLOGICAL MOLECULES
PRACTICE EXERCISE

TOPIC-WISE MCQs

Q.1 **The sum of all chemical reactions taking place within a cell is called:**
A. Thermoregulation
B. Osmoregulation
[✓ C. Metabolism]
D. Isomerism

Q.2 **Which one of the following is an example of anabolic process?**
A. Respiration
B. Digestion
[✓ C. Photosynthesis]
D. Both A and B

Q.3 **A mammalian cell contains 1.1 percentage:**
A. Protein
B. Water
C. DNA
[✓ D. RNA]

Q.4 **Most abundant organic compounds of a cell are:**
A. Water
[✓ B. Proteins]
C. Carbohydrates
D. Lipids

Q.5 **Water is a very good solvent for substance due to its ________ nature and act as ____ due to its higher heat capacity.**
[✓ A. Dipole nature, thermo-stabilizer]
B. Polar, bipolar
C. Organic, inorganic
D. Ionic, covalent

Q.6 **Due to higher heat capacity and H-bonds, water acts as:**
[✓ A. Thermo-stabilizer]
B. Solvent
C. Inert medium
D. Reactive medium

Q.7 **The water molecules remain attached together and do not separate because of bonding.**
A. Non-covalent
B. Ionic
[✓ C. Hydrogen]
D. Hydrophobic

Q.8 **Which property of water plays an important role in regulation of heat produced by oxidation?**
A. Heat capacity
[✓ B. Heat of vaporization]
C. Dipole nature
D. Ionization of water

Q.9 **Most abundant carbohydrate in nature is:**
[✓ A. Cellulose]
B. Polysaccharides
C. Starch
D. Glycogen

Q.10 **All of the following yield glucose on complete hydrolysis except:**
A. Starch
B. Cellulose
C. Glycogen
[✓ D. Chitin]

Q.11 **Glucose combines with _______ to form milk sugar.**
A. Glucose
[✓ B. Galactose]
C. Fructose
D. Mannose

Q.12 **Formation of a tri-saccharide involves release of _______ water molecule.**
A. 1
B. 3
[✓ C. 2]
D. 4

Q.13 **How many carbon atoms are present inside the ring of fructose?**

A. 6
B. 5
[✓ C. 4]
D. 3

Q.14 **Which of the following polysaccharide is present in human muscles abundantly?**

A. Myoglobin
B. Actin and myosin
C. Collagen
[✓ D. Glycogen]

*
Q.15 **Pick out the odd one:**

A. Cellulose
B. Agar
[✓ C. Galactose]
D. Pectin

Q.16 **Which of the following carbons are present outside the ring of fructose?**

A. 1st carbon & 2nd carbon
B. Only 1st carbon
C. 1st carbon and 5th carbon
[✓ D. 1st carbon and 6th carbon]

Q.17 **Which of the following sugar is sweetest?**

A. Glucose
[✓ B. Fructose]
C. Sucrose
D. Maltose

Q.18 **In a disaccharide, if carbon atoms are 12 then how many OH groups will be present?**

A. 11
B. 10
[✓ C. 8]
D. 12

Q.19 **Which of the following is non-reducing disaccharide sugar?**

A. Mannose
[✓ B. Sucrose]
C. Maltose
D. Lactose

Q.20 **Which of the following sugar is mainly present in human blood?**

[✓ A. Glucose]
B. Sucrose
C. Fructose
D. Mannose

Q.21 **How many types of amino acids are present in the cell?**

[✓ A. 170]
B. 25
C. 20
D. 3000

Q.22 **Which of the following amino acid is next to glycine with respect to the molecular structure?**

[✓ A. Alanine]
B. Ethanolamine
C. Serine
D. Aspartic acid

Q.23 **A globular protein consisting of more than one polypeptide chains belongs to:**

A. Primary structure
B. Tertiary structure
C. Secondary structure
[✓ D. Quaternary structure]

Q.24 **A protein having secondary structure possesses:**

A. Hydrogen bonding
B. Peptide bond
C. Disulfide bond
[✓ D. Both A, B]

Q.25 **All of the following are examples of fibrous proteins except:**

A. Silk fiber
[✓ B. Myoglobin]
C. Keratin
D. Fibrin

Q.26 **Which of the following is a complex of globular protein with non-proteinaceous material?**

A. Collagen
B. Fibrinogen
C. Albumin
[✓ D. Haemoglobin]

Q.27 **Muscle haemoglobin possesses:**

A. Primary structure
[✓ B. Tertiary structure]
C. Secondary structure
D. Quaternary structure

Myoglobin

Q.28 __________ **are defensive proteins.**
A. Antigens
B. Vaccines
[✓ C. Antibodies]
D. Fibrinogen

Q.29 Proteins of hair, horns, feathers and other skin parts are:
A. Storage protein
[✓ B. Structural protein]
C. Enzymatic protein
D. Hormonal protein

Q.30 Identify the protein, which cannot be crystallized?
A. Antibodies
B. Haemoglobin
[✓ C. Fibrin]
D. Enzymes

Q.31 How many peptide bonds are present in an insulin molecule?
[✓ A. 49]
B. 50
C. 51
D. 48

Q.32 Usually a polypeptide chain bends and folds upon itself to form a globular shape. This is protein's:
A. Primary conformation
[✓ B. Tertiary conformation]
C. Secondary conformation
D. Quaternary conformation

Q.33 It is an amino acid and also a part of phospholipid:
[✓ A. Serine]
B. Ethanolamine
C. Choline
D. Aspartic acid

Q.34 Myelin sheath of neuron is composed of:
[✓ A. Sphingolipids]
B. Ethanolamine
C. Choline
D. Waxes

Q.35 How many double bond/s is/are present in R-group of oleic acid?
A. 4
B. 2
C. 6
[✓ D. 1]

Q.36 Which of following cannot form a biopolymer?
A. Amino acid
B. Nucleotides
[✓ C. Fatty acid]
D. Monosaccharides

Q.37 All of the following biomolecules are nutritious except:
A. Carbohydrates
B. Lipids
C. Proteins
[✓ D. Nucleic acids]

Q.38 It contains nitrogenous base:
A. Glycogen
B. Cellulose
[✓ C. ATP]
D. Haemoglobin

Q.39 Nucleo-histones are present in:
A. Lysosome
B. Ribosomes
[✓ C. Chromosomes]
D. Mitochondria

Q.40 Conjugated histone proteins are:
[✓ A. Structural and regulatory]
B. Regulatory only
C. Structure only
D. Transport proteins

Q.41 All of the following are conjugated molecules except:
A. Glycolipids
B. Nucleoproteins
C. Glycoproteins
[✓ D. Phospholipids]

Q.42 Most of the cellular secretions are:
A. Glycolipids
B. Lipoproteins
[✓ C. Glycoproteins]
D. Nucleoproteins

PAST PAPER MCQs

Q.43 Which level of protein structure maintains the helix shape of enzymes? **(LUMHS 2014)**

A. Primary
[✓ B. Secondary]
C. Tertiary
D. Quaternary
E. A and B

Q.44 The simplest monosaccharide containing keto group is: **(MDCAT 2014)**

A. Glyceraldehyde
B. Glucose
[✓ C. Dihydroxyacetone]
D. Ribose

Q.45 Which one of the following is used in amino acid for protein synthesis, nucleic acid, hormones and co-enzyme? **(KMDC 2014)**

[✓ A. Carbon]
B. Hydrogen
C. Oxygen
D. Nitrogen

Q.46 Enzymes are molecules of one of the following group of biomolecules. Mark the correct answer which can also be defined as a biological catalyst. **(KMDC 2014)**

[✓ A. Protein]
B. Fats
C. Carbohydrate
D. vitamins

Q.47 Which molecular structure of enzyme is essential for activity of enzyme? (MDCAT 2015)

A. Primary structure
B. Secondary structure
C. Quaternary structure
[✓ D. Tertiary structure]

Q.48 The compounds which on hydrolysis yield polyhydroxy aldehyde or ketone subunits are: **(MDCAT 2016)**

A. Lipids
B. Polynucleotides
C. Proteins
[✓ D. Carbohydrates]

Q.49 Secondary structure of protein is found in: **(MDCAT 2016)**

A. Trypsin
B. Insulin
[✓ C. Keratin]
D. Glucagon

Q.50 Phosphodiester bond is: **(MDCAT 2016)**

A. P—O—C—P—O—C
[✓ B. C—O—P—O—C]
C. C—O—P
D. C—C—O—P

Q.51 _________are the major sites for the storage of glycogen in animal's body. (MDCAT 2017)

[✓ A. Muscle and liver]
B. Around belly and hips
C. Around thighs and belly
D. Liver and kidneys

Q.52 The number of amino acids that have been found to occur in cells and tissues are: **(MDCAT 2017)**

[✓ A. 170]
B. 25
C. 20
D. 45

Q.53 Most proteins are made up of type of amino acid. **(MDCAT 2017)**

[✓ A. 20]
B. 25
C. 170
D. 200

Q.54 If in lipids there is a higher proportion of unsaturated fatty acid, then it will be: **(MDCAT 2017)**

[✓ A. Oils]
B. Phenols
C. Waxes
D. Fats

Q.55 Which of the following type of carbohydrate has high molecular weight and is sparingly soluble in water? (MDCAT 2017)

A. Monosaccharide
B. Oligosaccharides
C. Disaccharides
[✓ D.] Polysaccharides

Q.56 Backbone of amino acid comprises of: (MDCAT2017)

[✓ A.] C-C-N
B. –NH_2 Group
C. –COOH group
D. –H group

Q.57 Bonds present in alpha helix are: (MDCAT 2017)

[✓ A.] Hydrogen bonds
B. Ionic bonds
C. Disulphide linkage
D. Peptide bonds

Q.58 Sequence of amino acids is important in: (MDCAT 2017)

[✓ A.] Primary structure
B. Tertiary structure
C. Secondary structure
D. Quaternary structure

Q.59 Glycosidic bond is formed by the: (MDCAT 2018)

[✓ A.] Removal of water
B. Removal of oxygen
C. Addition of oxygen
D. Addition of water

Q.60 Which of the following holds the alpha helix of protein in its place? (MDCAT 2018)

[✓ A.] Hydrogen bond
B. R-group
C. Amino group
D. Disulphide bond

Q.61 The number and sequence of amino acids along a polypeptide chain is called structure of a protein. (MDCAT 2018)

A. Secondary
[✓ B.] Primary
C. Quaternary
D. Tertiary

Q.62 Which of the following is unsaturated "fatty acid"? (MDCAT 2018)

A. Butyric acid
[✓ B.] Oleic acid
C. Stearic acid
D. Palmitic acid

Q.63 Which of the following basic structural level of protein is indicated by association of two alpha and two beta chains in the hemoglobin molecules?

[✓ A.] Primary structure
B. Secondary structure
C. Tertiary structure
[✓ D.] Quaternary structure

Q.64 If water has high latent heat of vaporization, how this property of water could be helpful to plants and animals? (MDCAT 2019)

A. With the release of large amount of water vapors, a small amount of heat loss can take place
B. No cooling effect with the release of even large amount of water vapors
C. It will keep their temperature very high
[✓ D.] With the release of small amount of water vapors, a great amount of heat loss can take place

Q.65 Starch is present in tuber, fruits and grains but absent in animal cells instead animals have a substance stored in liver and muscles known as: (MDCAT 2019)

A. Glucose
B. Galactose
[✓ C.] Glycogen
D. Glucagon

Q.66 The covalent bond or bridge between two monosaccharides to form a disaccharide is called a: (MDCAT 2019)

A. Carboxyl bond
B. Hydrogen bond
C. Hydroxyl bond
[✓ D.] Glycosidic bond

Q.67 Which is an example of a disaccharide? (MDCAT 2019)

[✓ A.] Lactose
B. Starch
C. Glycogen
D. Fructose

Q.68 Most proteins are made up of: (MDCAT 2019)
A. 16 types of amino acids
B. 170 types of amino acids
C. 10 types of amino acids
[✓ D. 20 types of amino acids]

Q.69 The structure of a fibrous protein comprises of polypeptide chains in the form of: (MDCAT 2019)
A. Cluster
B. Spherical or curled up ball
C. Flat uncoiled chains
[✓ D. Long strands or fibrils]

Q.70 In glycine, 'R' is ________. (MDCAT 2019)
A. Fatty acid
[✓ B. Hydrogen]
C. Ethane
D. Methane

Q.71 Sara is a chemistry student who is carrying out an experiment between an alcohol and acetic acid in the laboratory. The product formed at the end of the experiment will be: (MDCAT 2019)
A. Glucose and oxygen
[✓ B. An ester and water molecule]
C. Glycogen and water molecule
D. Glycerol and Sulfuric acid

Q.72 Lipids contain double amount of energy as compared to the same amount of carbohydrates due to the presence of: (MDCAT 2019)
A. Lower proportion of C–H bonds
B. Higher proportion of C–O bonds
[✓ C. Higher proportion of C–H bonds]
D. Higher proportion of oxygen

Q.73 Chitin is a: (ETEA 2019)
A. Lipoprotein
[✓ B. Polysaccharide]
C. Glycoprotein
D. Phospholipid

Q.74 ________ is stored in animal cells: (ETEA 2019)
A. Starch
B. Cellulose
C. Sucrose
[✓ D. Glycogen]

Q.75 The bond that is formed b/w two monosaccharide units is called: (ETEA 2019)
A. Ionic bond
B. Hydrogen bond
C. Peptide bond
[✓ D. Glycosidic bond]

Q.76 Lipids are organic molecules which are insoluble in: (AJK 2019)
A. Alcohol
B. Ether
C. Chloroform
[✓ D. Water]

Q.77 The number and sequence of amino acids in a polypeptide chain is known as its ________. (AJK 2019)
[✓ A. Primary structure]
B. Tertiary structure
C. Secondary structure
D. Quaternary structure

Q.78 Pure form of cellulose is: (AJK 2019)
[✓ A. Cotton]
B. Chitin
C. Cellophane
D. Paper

Q.79 The best example of polysaccharide which is stored in animal is called: (AJK 2019)
A. Lactose
B. Cellulose
C. Sucrose
[✓ D. Glycogen]

Q.80 $C_5H_{10}O_4$ is the formula of ________. (AJK 2019)
[✓ A. Deoxyribose sugar]
B. RNA
C. DNA
D. ATP

Q.81 Which type of bonds is required to maintain the alpha helix configuration of a protein? (AJK 2019)

A. Hydrophobic interactions
B. Disulfide bonds
[✓ C. Hydrogen bonds]
D. Ionic bonds

Q.82 What type of linkage is formed when an alcohol and an acid react? (AJK 2019)

A. Hydrogen bond
B. Peptide bond
C. Glyosidic linkage
[✓ D. Ester bond]

Q.83 Is the storage form of carbohydrates in animal's humans which is equivalent to the in plants?

A. Glycogen, cellulose
B. Starch, cellulose
C. Starch, glycogen
[✓ D. Glycogen, starch]

Q.84 Which property of water helps to maintain the integrity of lipid membranes: (PMC 2020)

A. Specific heat capacity
B. Cohesion and adhesion
C. Hydrogen bonding
[✓ D. Hydrophobic exclusion]

Q.85 Water act as universal solvent because of: (PMC 2020)

A. Heat of vaporization
[✓ B. High polarity]
C. Hydrogen bonding
D. Cohesion and adhesion

Q.86 Lipids store double amount of energy as compared to carbohydrates because of: (PMC 2020)

A. High proportion of oxygen
B. Low proportion of carbon
C. High CO ratio
[✓ D. High proportion of CH]

Q.87 Which of the following is an unsaturated fatty acid? (PMC 2020)

[✓ A. Oleic acid]
B. Butyric acid
C. Palmitic acid
D. Acetic acid

Q.88 Monosaccharides have a general formula represented by: (PMC 2020)

[✓ A. $Cn(H_2O)_n$]
B. $C_2(H_2O)_n$
C. $C(H_2O)_n$
D. $C_1(H_2O)_n$

Q.89 Water acts as a temperature stabilizer for many organisms in the environment because of its: (AJK 2019)

A. High surface tension
B. Latent heat of vaporization
[✓ C. High specific heat capacity]
D. Density

Q.90 The head of phospholipid molecule is polar (hydrophilic) due to: (AJK 2019)

A. Fatty acid
[✓ B. Phosphate]
C. Carboxylic acid
D. Triacylglycerol

Q.91 Which of the following is the constituent of RNA molecule? (NUMS 2019)

A. Fatty acids
[✓ B. Ribonucleic acid]
C. Ascorbic acid
D. Deoxyribonucleic acid

Q.92 Which of the following are instant source of energy in living organisms, like glucose? Their general formula is: (NUMS 2019)

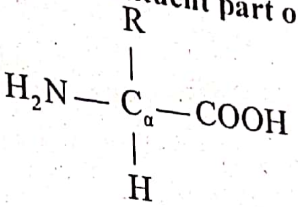
[✓ A. $Cx(H2O)Y$]
B. $CxH12O6$
C. $Cx(H2O)X$
D. $C_x(HO)_Y$

Q.93 **Which of the following are the most prominent part of cell membranes in living organisms?** (NUMS 2019)

A. Terpenoids B. Waxes

C. Phospholipids D. Acylglycerols

Q.94 **The structure given below is the constituent part of:** (NUMS 2019)



$$H_2N-\underset{\displaystyle H}{\overset{\displaystyle R}{\overset{|}{\underset{|}{C_\alpha}}}}-COOH$$

A. Lipids B. Carbohydrates

C. Vitamins D. Proteins

ANSWER KEY

TOPIC-WISE MCQs & PAST PAPER MCQs

1	C	16	D	31	A	46	A	61	B	76	D	91	B
2	C	17	B	32	B	47	D	62	B	77	A	92	A
3	D	18	C	33	A	48	D	63	A	78	A	93	C
4	B	19	B	34	A	49	C	64	D	79	D	94	D
5	A	20	A	35	D	50	B	65	C	80	A		
6	A	21	A	36	C	51	A	66	D	81	C		
7	C	22	A	37	D	52	A	67	A	82	D		
8	B	23	D	38	C	53	A	68	D	83	D		
9	A	24	D	39	C	54	A	69	D	84	D		
10	D	25	B	40	A	55	D	70	B	85	B		
11	B	26	D	41	D	56	A	71	B	86	D		
12	C	27	B	42	C	57	A	72	C	87	A		
13	C	28	C	43	B	58	A	73	B	88	A		
14	D	29	B	44	C	59	A	74	D	89	C		
15	C	30	C	45	A	60	A	75	D	90	B		

EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

1. Temperature regulation, water and salt regulation respectively called thermoregulation and osmoregulation, while isomerism is the phenomenon in which more than one compounds have the same chemical formula but different structures.

2.

Process	Definition	Example	Energy relation
Anabolism	Formation of larger molecules from smaller one	Photosynthesis	Energy absorbed
Catabolism	Breakdown of larger molecules into smaller	Respiration & digestion	Energy released

3.

Sr.No.	Chemical Components	% total cell weight	
		Bacterial Cell	Mammalian Cell
1.	Water	70	70
2.	Proteins	15	18
3.	Carbohydrates	3	4
4.	Lipids	2	3
5.	DNA	1	0.25
6.	RNA	6	1.1
7.	Organic molecules (enzymes, hormones, metabolites)	2	2
8.	Inorganic ions (Na$^+$,K$^+$,Mg^{+2},Cl$^-$,SO$_4^{-2}$etc.)	1	1

4.

Sr.No.	Chemical Components	% total cell weight	
		Bacterial Cell	Mammalian Cell
1.	Water	70	70
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3.	Carbohydrates	3	4
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7.	Organic molecules (enzymes, hormones, metabolites)	2	2
8.	Inorganic ions (Na$^+$,K$^+$,Mg^{+2},Cl$^-$,SO$_4^{-2}$etc.)	1	1

5. Water is an excellent solvent for polar substances due to its dipole nature. Ions and molecules move randomly and are in a more favorable state to react with other molecules and ions when in solution and water have great ability to absorb heat due to higher heat capacity and act as thermo-stabilizer.

6. Water has great ability to absorb heat with minimum change in its own temperature due to higher heat capacity and act as thermo-stabilizer.

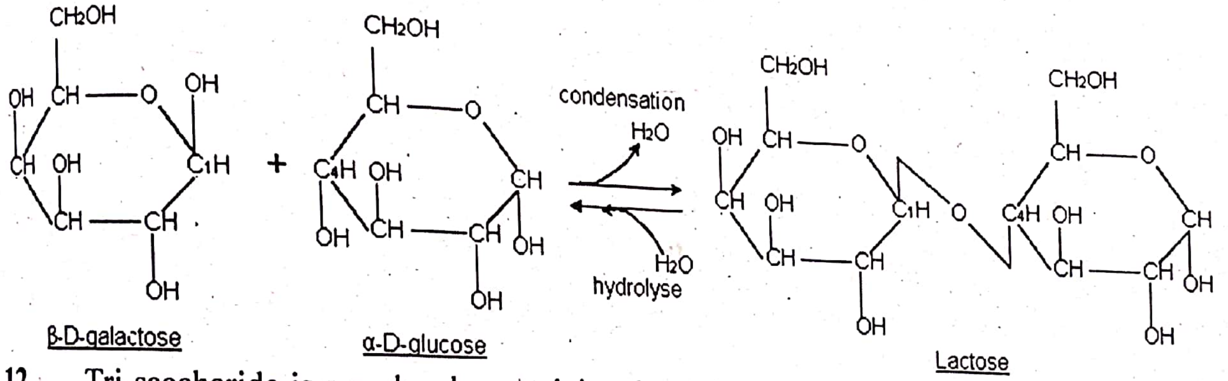
7. The sticking together of like substances is called cohesion. Depending on how attracted molecules of the same substance are to one another, the substance will be more or less cohesive. Hydrogen bonds cause water to be exceptionally attracted to each other. Therefore, water is very cohesive.

8. Evaporation causes cooling because the process requires heat energy. The energy is taken away by the molecules when they convert from liquid into gas, and this causes cooling on the original surface.

9. Cellulose is a type of polysaccharide which contains chains of glucose rings providing strength and rigidity. Cellulose forms the cell walls of plants and is the primary constituent of wood, making this organic compound, the most abundant one on the surface of the Earth.

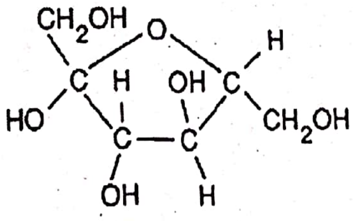
10. Chitin is a N_2-containing polysaccharide and it will yield N-acetyl-D-glucosamine on hydrolysis while starch and glycogen will yield α-D glucose monomers and Cellulose will yield β-D glucose monomers on hydrolysis.

11.



12. Tri-saccharide is a molecule containing three monosaccharides, there is single glycosidic bond between two adjacent monosaccharides and third monosaccharide will bind to already bound disaccharide by forming another glycosidic bond. Thus there will be two glycosidic bonds and one water molecule will be released from each glycosidic bond.

13. Four carbon atoms are present inside the ring of fructose while two carbon atoms are present outside of the ring.

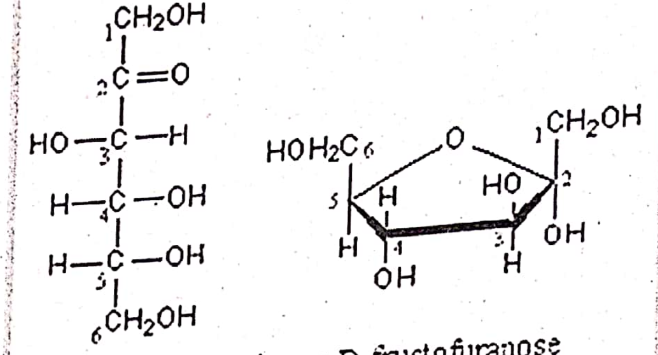


Fructose

14. Glycogen is most abundant polysaccharide present in human muscles and liver while myoglobin, collagen, actin and myosin are proteins.

15. Cellulose, agar and pectin are the examples of polysaccharides but galactose is an example of monosaccharide.

16.

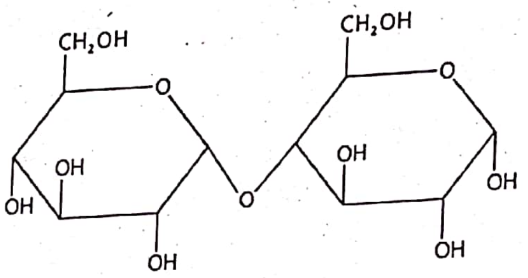


D-fructose (linear) α-D-fructofuranose

17. Fructose has ketone functional group which gives sweet taste when dissolved in water.

18.

Maltose



Glucose Glucose

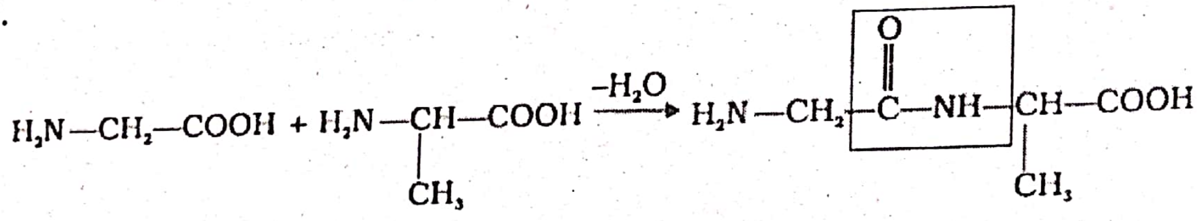
19. The reducing group in sucrose is used in glycosidic bond formation due to which it is non-reducing in nature. On the other hand, mannose, maltose and lactose are all reducing sugars.

20. In non-diabetic individuals, the concentration of glucose in the blood is about 0.08%.

21.

- 170 amino acids are present in nature in cells or tissues.
- 25 types of amino acid are constituents of proteins.
- Most of the proteins can be synthesized by the combinations of 20 types of amino acids.

22.



$$H_2N-CH_2-COOH + H_2N-\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOH \xrightarrow{-H_2O} H_2N-CH_2-\boxed{\overset{\displaystyle O}{\overset{\|}{C}}-NH-}\underset{\displaystyle CH_3}{\underset{|}{CH}}-COOH$$

(Glycine) (Alanine) (Glycylalanine)

23. In many complex proteins, polypeptide tertiary chains are aggregated and held together by hydrophobic interactions, hydrogen and ionic binds. This specific arrangement is the quaternary structure.

24. All proteins have primary structure; amino acids are joined with each other through peptide bonds. In secondary structure, polypeptide chain coils to form either α helix or β-pleated sheet or both through hydrogen bonds.

25. Silk fiber, keratin and fibrin are examples of fibrous proteins while myoglobin has tertiary structure and it is a typical water soluble globular protein found in muscles.

26. Hemoglobin consists of 4 polypeptide chains forming a quaternary structure, and 4 haem groups containing 4 iron atoms as a non-protein part of the molecule.

27. Myoglobin, also called as muscle haemoglobin, is made up of single polypeptide chain which coils upon itself forming tertiary structure.

28. Antibodies are also called immunoglobulins; they are the part of immune system and protect body against invading pathogens.

29. Usually fibrous proteins containing secondary structure are structural proteins.

30. Fibrin is an example of fibrous protein and cannot crystallized. Antibodies, hemoglobin and enzymes are globular proteins and can be crystallized.

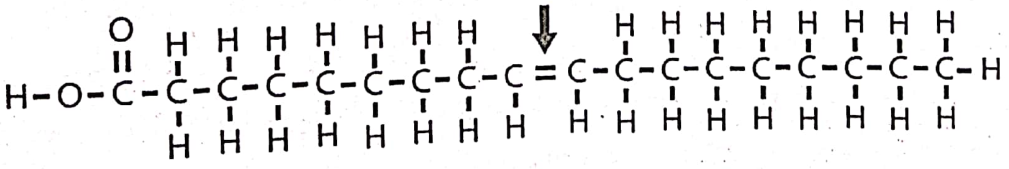
31. There are two polypeptide chains in insulin. One containing 21 amino acids and the other containing 30 amino acids. The bond between each chain is one less than the total number of the amino acids. In this way number of peptide bonds will be 49 out of 51 amino acids.

32. When a single polypeptide chain folds upon itself and form globular structure, it is tertiary structure of the proteins. It is maintained by three types of bonds, namely ionic, hydrogen and disulfide.

33. Serine and aspartic acids are examples of amino acids while choline and ethanolamine are N_2-containing bases. Serine can be the constituent of phospholipids and acts as nitrogenous base.

34. The myelin sheath of neurons is composed of sphingolipids. Ethanolamine and choline are nitrogenous bases found in phospholipids. Waxes are abundantly found in protective covering of fruits and leaves.

35.



$$H-O-\overset{\overset{O}{\|}}{C}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-\underset{H}{C}\overset{\Downarrow}{=}\underset{H}{C}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-\overset{H}{\underset{H}{C}}-H$$

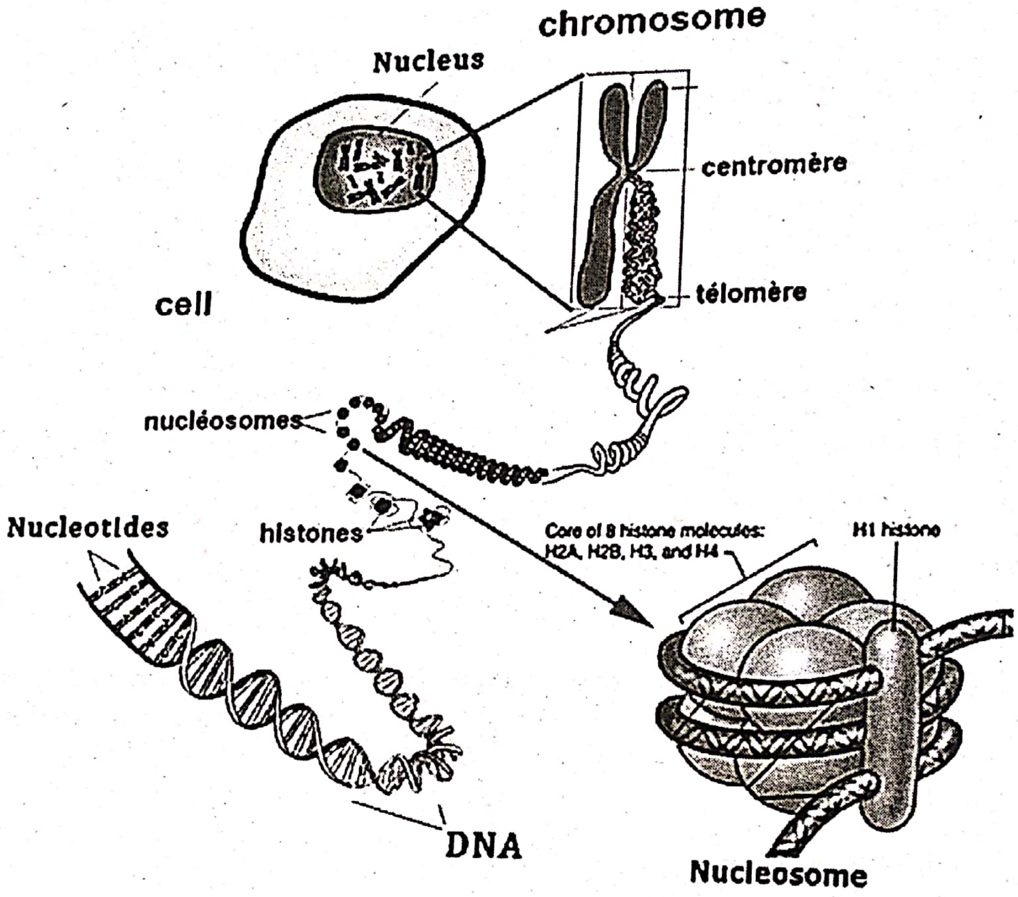
Oleic acid - Monounsaturated fatty acid

36. Amino acids join to form proteins. Nucleotides join to form nucleic acid while monosaccharides join to form polysaccharides.

37. Through metabolism carbohydrates, lipids and proteins all can be the source of energy, while nucleic acids are not the source of energy.

38. ATP is a nucleotide which contains pentose sugar, nitrogenous base and three phosphate groups. Glycogen and cellulose are polysaccharides and hemoglobin is a quaternary protein.

39.

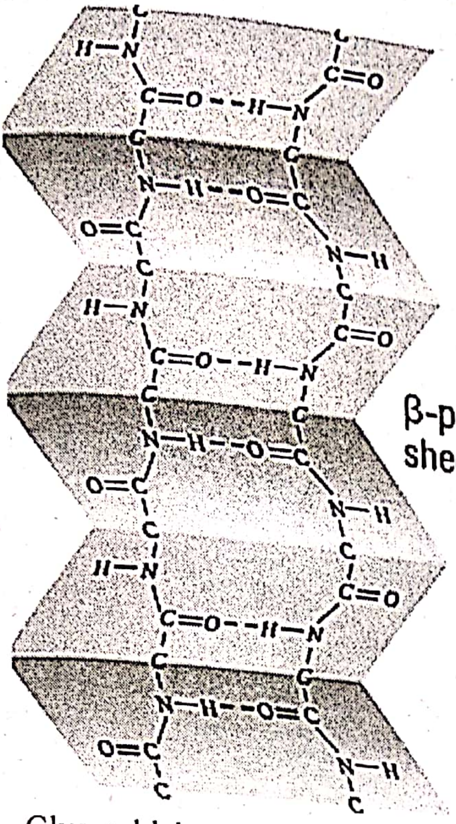


40. Histones are the chief protein components of chromatin, acting as spools around which DNA winds, and playing a role in gene regulation. Without histones, the unwound DNA in chromosomes would be very long.

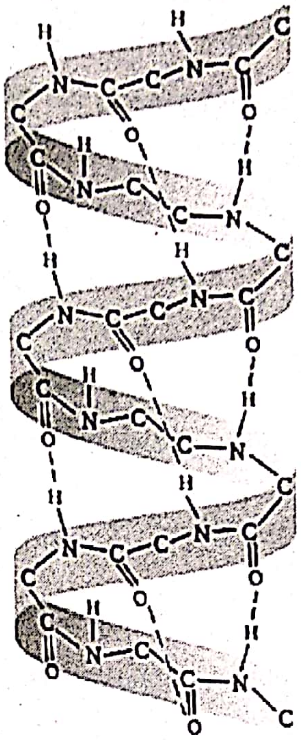
41. Two different molecules belonging to different categories, usually combine together to form conjugated molecules.

42. The Golgi apparatus is responsible for cellular secretion. When protein vesicles move to Golgi apparatus for delivery to targeted destinations. As the secretory proteins move through the Golgi apparatus, a number of chemical modifications like Glycosylation may occur.

43.



β-pleated sheet



α helix

44. Glyceraldehyde, ribose and glucose are also sugar while dihydroxyacetone are simplest three carbon keto sugar.

45. Carbon, hydrogen, oxygen and nitrogen are the basic components of proteins, nucleic acid, hormones and co-enzymes.

46. All enzymes are proteins in nature which can be as a biological catalyst.

47. Globular structure of enzyme has very important role in its activity and this globular structure is attaining at least tertiary level structure.

48. Carbohydrates are polyhydroxy aldehydes or ketones or complex substances which on hydrolysis yield polyhydroxy aldehyde or ketone sub-units. Proteins are polymers of amino acids. Lipids are heterogeneous group of compounds related to fatty acid while polynucleotide chain is made up of nucleotide.

49. Keratin is a fibrous protein having secondary structure and mostly found in nails and hairs. Trypsin is a protease while insulin and glucagon are the hormones and all are globular proteins

50. The bond between two nucleotides is called Phosphodiester bond and it is formed between phosphate group of one nucleotide attach at carbon 5 of pentose sugar with hydroxyl group of 3 carbon of pentose sugar of another nucleotide.

51. Glycogen is called as animal starch and it is abundantly found in muscle and liver cells of animal tissue.

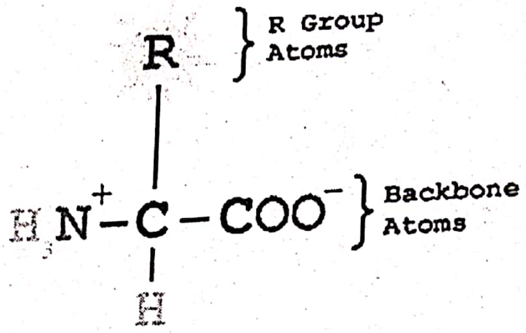
52. About 170 types of amino acids have been found to occur in cells and tissues. Of these, about 25 are constituents of proteins. Most of the proteins are, however, made of 20 types of amino acids.

53. About 170 types of amino acids have been found to occur in cells and tissues. Of these, about 25 are constituents of proteins. Most of the proteins are however, made of 20 types of amino acids.

54. Fats containing unsaturated fatty acids are usually liquid at room temperature and are said to be oils. Fats containing saturated fatty acids are solids.

55. Polysaccharides are made up of many monosaccharides subunits and have higher molecular weight as compare to monosaccharide and oligosaccharide. Polysaccharides are sparingly soluble in water while monosaccharide are highly soluble.

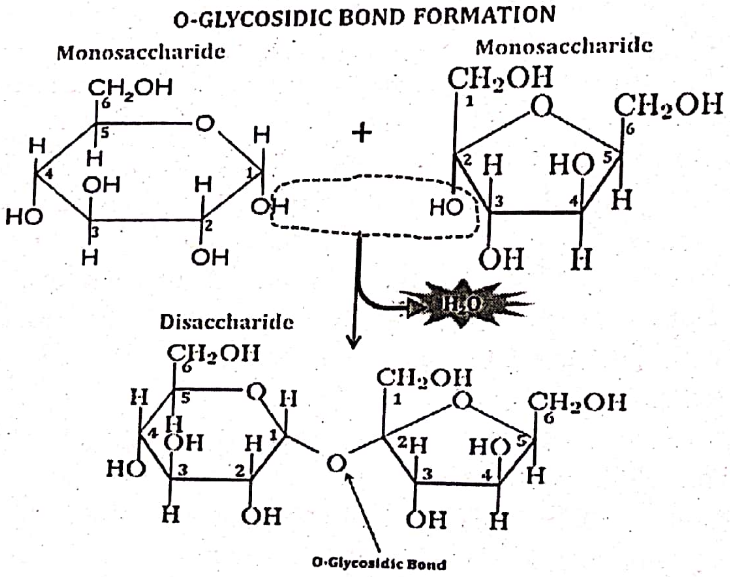
56.



57. The α-helix is a very uniform geometric structure with 3.6 amino acids in each turn of the helix. The helical structure is kept by the formation of hydrogen bonds among the amino acids molecules in successive turns of the spiral.

58. The primary structure of a protein is described by number, sequence and types of amino acids in a polypeptide chain.

59.



60. The α-helix is a very uniform geometric structure with 3.6 amino acids in each turn of the helix. The helical structure is kept by the formation of hydrogen bonds among the amino acids molecules in successive turns of the spiral.

61. The primary structure of a protein is described by number, sequence and type of amino acids in a polypeptide chains.

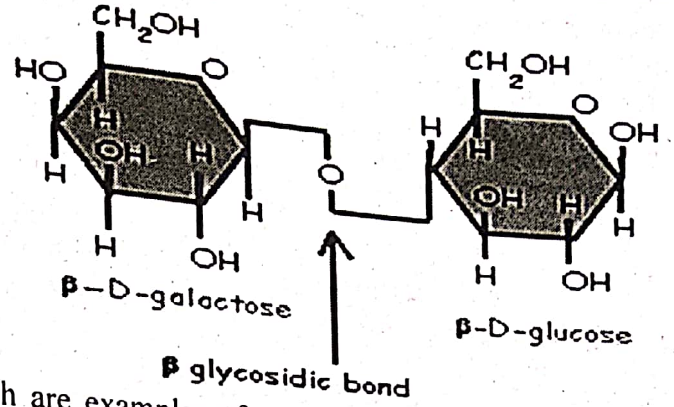
62. Butyric acid, palmitic acid and stearic acids examples of saturated fatty acids. Oleic acid is an example of mono-unsaturated fatty acid and has double bond between C_9 and C_{10}.

63. Hemoglobin is four polypeptides (2 alpha and 2 beta chains) globular protein. But basic structure of all proteins is primary structure.

64. Water absorbs much heat as it changes from liquid to gas and causes cooling effect.

65. Evaporation of only two ml out of one liter of water lowers the temperature of the remaining 998 ml by 1°C.

66. Glycogen is animal starch found in liver and muscle cell while starch is stored in plants cells.



67. Glycogen and starch are examples of polysaccharides while fructose is an example of monosaccharide.

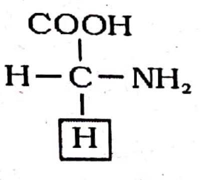
68. About 170 types of amino acids have been found to occur in cells and tissues. Of these, about 25 are constituents of proteins. Most of the proteins are however, made of 20 types of amino acids.

69.

Fibrous Protein

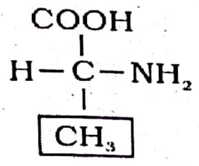
Globular Protein

70.



$$\begin{array}{c}COOH\\ |\\ H-C-NH_2\\ |\\ \boxed{H}\end{array}$$

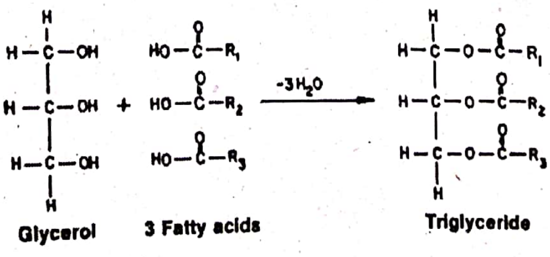
Glycine



$$\begin{array}{c}COOH\\ |\\ H-C-NH_2\\ |\\ \boxed{CH_3}\end{array}$$

Alanine

71. Chemically, acylglycerol can be defined as esters of fatty acids and alcohol.

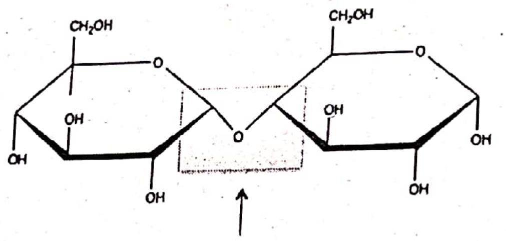


72. C-H bond is potential source of energy. Lipids have higher proportion of C-H bonds as compare to carbohydrates and proteins.

73. Lipoproteins and glycoproteins are conjugated molecules; phospholipids are class of lipids that form basic structure of biological membrane. Chitin is only polysaccharide that contain nitrogen, and it is component of fungal cell wall as well as exoskeleton of insects.

74. Starch is a storage form of polysaccharides in plants while glycogen is a storage form of carbohydrates in animal cells. Cellulose is present in cell wall.

75.



Glycosidic Bond

76. Due to non-polar nature lipids are only solubilized in non-polar substances. Water is a polar substance.

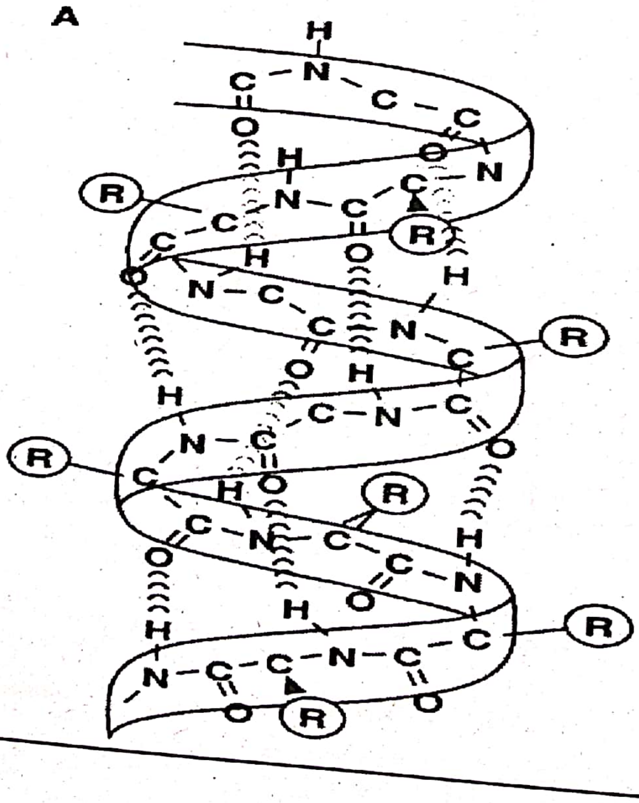
77. The primary structure of a protein refers to the sequence of amino acids in the polypeptide chain. The primary structure is held together by peptide bonds that are made during the process of protein biosynthesis. The sequence of a protein is unique to that protein, and defines the structure and function of the protein.

78. Cellulose is most abundantly present polysaccharide. It is present in plants cell wall. Chitin is also a polysaccharide which present in fungi cell wall. Cellophane is a thin, transparent sheet made of regenerated cellulose.

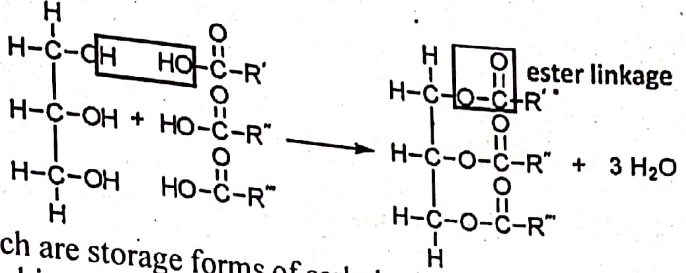
79. Glycogen is a storage polysaccharide in animals liver and muscles cells. Cellulose is a structure polysaccharide. Lactose and sucrose are disaccharides.

80. Formula of ribose is $C_5H_{10}O_5$

81.



82.



83. Glycogen and starch are storage forms of carbohydrates in animals and plants respectively.

84. When a hydrophobic molecule is dropped in an aqueous medium, hydrogen bonds between water molecules will be broken to make room for the hydrophobic molecule; however, water molecules do not react with hydrophobic molecule. This is considered an endothermic reaction, because when bonds are broken heat is put into the system.

85. A solvent is simply a substance that can dissolve other molecules and compounds, which are known as solutes. Because of its polarity and ability to form hydrogen bonds, water makes an excellent solvent, meaning that it can dissolve different kinds of molecules.

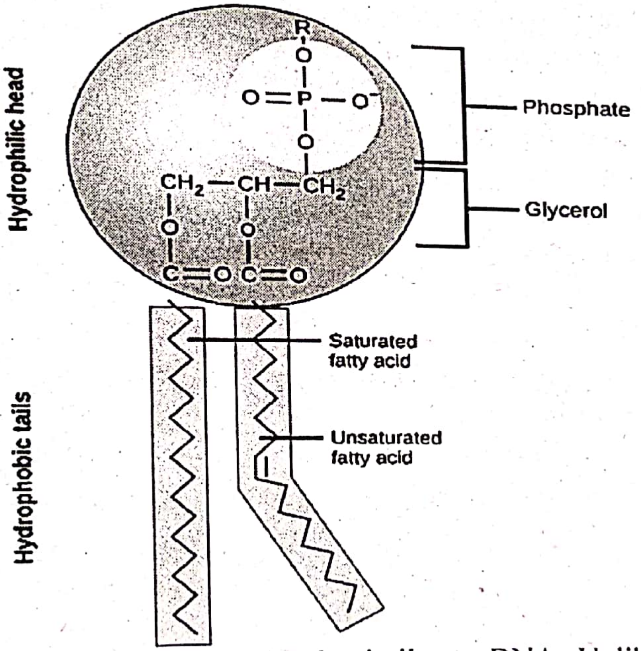
86. Lipids are used as energy storage via fatty acids. Fatty acids are composed of carboxylic acids attached to long chains of hydrocarbons. So percentage of C---H bonds in lipids is much higher.

87. Oleic acid is slightly larger (18 carbons) and is an example of an unsaturated fatty acid.

88. General formula of monosaccharides is $C_n(H_2O)_n$ as number of carbon and oxygen is usually same in monosaccharides.

89. Due to presence of hydrogen bonding in water molecule it acts as temperature satilizer of many organisms in the environment.

90.



91. **Ribonucleic acid** (**RNA**) is a molecule similar to DNA. Unlike DNA, **RNA** is single-stranded. An **RNA** strand has a backbone made of alternating sugar (ribose) and phosphate groups. Attached to each sugar is one of four bases--adenine (A), uracil (U), cytosine (C), or guanine (G)

92. $C_X(H_2O)_Y$ is the general formula of all carbohydrates.

93. Basic structure of cell membrane is formed by phospholipids.

94. It is general formula of all amino acids.

4 CELL STRUCTURE AND FUNCTION

TOPIC » PRACTICE EXERCISE

TOPIC-WISE MCQs

Q.1 The layers of cellulosic fibers in cell wall are arranged with each other at:

A. Obtuse angle
B. Parallel angle
[✓ C. Right angle]
D. Horizontal angle

Q.2 Which of the following is related to prokaryotic cell wall?

A. Murein
B. Sacculus
C. Peptidoglycan
[✓ D. All A, B, C]

Q.3 It is absent in secondary cell wall:

A. Silica
[✓ B. Pectin]
C. Waxes
D. Cutin

Q.4 All of following are common molecules in membrane of all type of cells except:

A. Globular protein
B. Traces of carbohydrates
[✓ C. Cholesterol] Not Present in Cytoplasm.
D. Phospholipid

Q.5 Hydrophobic portion of plasma membrane is present in/at:

A. Towards extracellular matrix
[✓ B. Inner core of plasma membrane]
C. Towards cytoplasm
D. Towards the cytoskeleton

Q.6 Which of the following describes the fluid mosaic model of plasma membrane structure?

A. Phospholipid monolayer with embedded proteins
[✓ B. Phospholipid bilayer with embedded proteins]
C. Triglyceride bilayer with embedded proteins
D. Triglyceride monolayer with embedded proteins

Q.7 In plasma membrane, carbohydrates combine with the lipids and proteins to form glycolipids and glycoproteins and are oriented:

A. Towards inside
B. Towards inside and outside
[✓ C. Towards outside]
D. Randomly distributed

Q.8 Which of the following is not a characteristic feature of animal cell membrane?

A. Provides mechanical shape
B. Regulate passage of molecules
C. Maintain cellular homeostasis
[✓ D. Prevent from osmotic lysis]

Q.9 Which of the following acts as receptor site on plasma membrane?

A. Head of phospholipid molecules
B. Tail of phospholipid molecules
C. Cholesterol molecules
[✓ D. Glycoprotein]

Q.10 Which structure is the most important for cellular life?

A. Nucleus
[✓ B. Cell membrane]
C. Chromosome
D. Mitochondria

Q.11 Peripheral parts of the cell are often like:

A. Sol
[✓ B. Gel]
C. Solid
D. None of these

Q.12 All of the following organelles contain DNA except:

[✓ A. Ribosomes]
B. Nucleus
C. Chloroplast
D. Mitochondria

Q.13 40S is the smaller ribosomal sub-unit, associated with ______.
A. *E. coli*
[✓ B. Yeast]
C. *C. botulinum*
D. *T. pallidum*

Q.14 Identify non-membranous organelle from the following:
A. Endoplasmic reticulum
B. Nucleus
[✓ C. Ribosome]
D. Chloroplast

Q.15 Which of the following best describes the function of RER in eukaryotic cells?
A. Glycosylation of proteins
[✓ B. Synthesis of proteins]
C. Synthesis of lipids
D. Synthesis of ribosomes

Q.16 Which of the following statement is incorrect regarding endoplasmic reticulum?
A. Plasma cells have RER in abundance
[✓ B. RER is more than SER in adipose tissue]
C. RBCs lack both RER and SER
D. Hepatocytes has both RER and SER

Q.17 A function that is not related to smooth endoplasmic reticulum:
A. Calcium storage
[✓ B. Enzyme synthesis]
C. Steroid synthesis
D. Mechanical support

Q.18 Which of the following organelle is associated with the single membrane?
A. Mitochondria
B. Nucleus
[✓ C. Endoplasmic Reticulum]
D. Chloroplast

Q.19 Which of the following function is performed by both types of endoplasmic reticulum?
A. Protein synthesis
B. Muscle contraction
[✓ C. Mechanical support]
D. Detoxification of harmful drugs

Q.20 Which of the following organelle is responsible for the production of steroid hormones?
A. Mitochondria
[✓ B. Smooth endoplasmic reticulum]
C. Golgi bodies
D. Rough endoplasmic reticulum

Q.21 Identify the correct pair from the following options:
A. DNA replication - Ribosome
B. Anaerobic respiration - Cristae
C. Protein synthesis - SER
[✓ D. Modification - Golgi apparatus]

Q.22 Modification of proteins and lipids into glycoproteins and glycolipids is the function of:
A. Mitochondria
B. Lysosome
C. Ribosomes
[✓ D. Golgi apparatus]

Q.23 Golgi complex is involved in the formation of ________.
[✓ A. Lysosomes]
B. Vacuoles
C. RER
D. SER

Q.24 The transport of secretory proteins takes place through organelles in which of the following order?
[✓ A. RER→SER→ Golgi apparatus→ Secretory vesicles]
B. SER→ RER→ Golgi apparatus→ Secretory vesicles
C. RER→ SER→ Secretory vesicles→ Golgi apparatus
D. RER→ Golgi apparatus→ Secretory vesicles→ SER

Q.25 Which of the following organelle is most abundant in those animal cells which exhibit phagocytic activity?
A. Glyoxisomes
[✓ B. Lysosomes]
C. Microbodies
D. Peroxisomes

Q.26 Strictly speaking, autophagosomes are actually:
[✓ A. Primary lysosomes]
B. Tertiary lysosomes
[✓ C. Secondary lysosomes]
D. Quaternary lysosomes

Q.27 It is a disease characterized by the accumulation of lipids in the brain cells leading to mental retardation and even death:

A. Grave's disease
B. Glycogenosis type II disease
C. Addison's disease
[✓ D. Tay-Sach's disease]

Q.28 _______ provides support for the individual plant cell and contributes to the turgidity of the leaves and younger parts of plants.

[✓ A. Vacuole]
B. Endoplasmic reticulum
C. Golgi apparatus
D. Cytoskeleton

Q.29 What is the specific name given to biological membrane that surrounds the vacuoles?

A. Plasma membrane
B. Plasmalemma
C. Endomembrane
[✓ D. Tonoplast]

Q.30 Which of the following cell organelle can be viewed with the help of high power light microscope?

A. Endoplasmic reticulum
[✓ B. Mitochondria]
C. Ribosomes
D. Golgi apparatus

Q.31 It is the correct location of ATP synthase in mitochondria:

A. Mitochondrial matrix
B. Outer mitochondrial membrane
[✓ C. Inner mitochondrial membrane]
D. Inter membrane space

Q.32 Which of the following structure is involved in oxidative phosphorylation?

[✓ A. Inner mitochondrial membrane]
B. Outer mitochondrial membrane
C. Mitochondrial matrix
D. Thylakoid membrane

Q.33 Krebs cycle occurs in ________ of mitochondria.

[✓ A. Matrix]
B. Stroma
C. F_1 particles
D. Cristae

Q.34 Which of the following cell type is more appropriate to study mitochondria?

A. RBC
B. Mesophyll cell
[✓ C. Muscle cell]
D. *E. coli*

Q.35 Which of the following eukaryotic organelle has symbiotic origin with bacteria?

A. Endoplasmic reticulum
B. Lysosomes
[✓ C. Chloroplast]
D. Golgi apparatus

Q.36 Chlorophyll molecule resembles with:

A. Carotenoids
B. Globin chains of hemoglobin
C. Xanthophylls
[✓ D. Haem part of hemoglobin]

Q.37 Which of the following statement is incorrect?

A. CO_2 fixation occurs in stroma
B. Chloroplasts are self-replicating
[✓ C. Inter-granum is photosynthetic]
D. Chloroplasts have 70S ribosomes

Q.38 Nucleolus is visible in:

[✓ A. Interphase]
B. Metaphase
C. Mitotic phase
D. Anaphase

Q.39 Which of the following organelle have a continuous connection with nuclear membrane?

A. Golgi Apparatus
[✓ B. RER]
C. Lysosomes
D. SER

Q.40 It precisely describes the function of nucleoli:

A. Formation and breakdown of nuclear envelope
B. Formation of ribosomes
C. Formation of centromere
D. Organization of spindle during nuclear division

Q.41 rRNA is actively synthesized in:
A. Lysosome
B. Nucleoplasm
[✓ C. Nucleolus]
D. Ribosomes

Q.42 How many nuclear pores are present a typical differentiated cell, such as RBCs?
A. About 30,00 per nucleus
B. About 1-2 per nucleus
C. About 30,000 per nucleus
[✓ D. About 3-4 per nucleus]

Q.43 Plant cells are distinguishable from animal cells in containing:
A. Mitochondria
B. Endoplasmic reticulum
C. Ribosomes
[✓ D. Cell wall]

Q.44 Pick the correct one w.r.t plant cell:

	Mitochondria	Peroxisome	Centrioles
A	✓	×	✓
[✓ B]	✓	✓	×
C	×	✓	✓
D	×	✓	×

Q.45 Which of the following statement is true?
A. Prokaryotic cells are bigger than eukaryotic cells
[✓ B. Prokaryotic cells evolved before eukaryotic cells]
C. Eukaryotic cells do not have a nucleus, prokaryotic cell do
D. Eukaryotic cells are simple, prokaryotic cells are complex

Q.46 What is the main difference between prokaryotes and eukaryotes?
A. Prokaryotes cannot undergo cell division
[✓ B. Prokaryotes do not have internal membranes]
C. Prokaryotes have no DNA
D. Prokaryotes have no cytosol

Q.47 Prokaryotic and eukaryotic cells generally have which of the following feature in common?
A. A membrane bounded nucleus
B. A cell wall made up cellulose
[✓ C. Presence of ribosomes]
D. Linear genome

Q.48 The distinguishing feature of prokaryotic cell is its:
A. Chemical nature of DNA
B. Ribosomes
[✓ C. Cell wall]
D. Cytoplasmic Streaming movement

PAST PAPER MCQS

Q.49 The intake of liquid materials across the cell membrane is: **(MDCAT 2014)**
A. Phagocytosis
[✓ B. Pinocytosis]
C. Endocytosis
D. Exocytosis

Q.50 Which component of the cell is concerned with cell secretions? **(MDCAT 2014)**
A. Plasma membrane
B. Cytoskeleton
[✓ C. Golgi complex]
D. Mitochondria

Q.51 In mitochondria, small knob-like structures called F_1 particles are found in: **(MDCAT 2014)**
A. Outer membrane
[✓ B. Inner membrane]
C. Outer compartment
D. Inner compartment

Q.52 Peptidoglycan or murein is a special or distinctive feature of cell wall in:(MDCAT 2014)
A. Algae
B. Bacteria
C. Fungi
D. Plants

Q.53 Which substance from the following is important for the mechanical stability of cell membranes, as without it membranes quickly break and cells burst open? The hydrophobic region of this molecules help to prevent ion or polar molecules from passing through the cell membrane? **(KMDC 2014)**

A. Protein
[✓ B. Phospholipids]
C. Glycolipids
D. Cholestrol

Basic structure of plasma membrane is made by phospholipids.

Q.54 Fluid mosaic model of plasma membrane states that protein molecules float in a fluid like ________ layer. **(MDCAT 2015)**

A. Galactose
B. Glucose
[✓ C. Phospholipids]
D. Carbohydrate

Q.55 Ribosomes are tiny organelles, which are involved in the synthesis of: **(MDCAT 2015)**

[✓ A. Protein]
B. Nucleus
C. RNA
D. Nucleosome

Q.56 Which one of the following cell structure is involved in the synthesis of lipids? **(MDCAT 2015)**

[✓ A. Endoplasmic reticulum]
B. Centriole
C. Golgi complex
D. Mitochondria

Q.57 Which organelle is bounded by two membranes? **(MDCAT 2015)**

A. Ribosome
B. Lysosome
[✓ C. Mitochondria]
D. Nucleolus

Q.58 Tay-Sach's disease occurs when cells are unable to produce an enzyme leading to a build up to certain lipids in cell. Which cells structure would not function correctly, resulting in the disease? **(LUMHS 2015)**

A. Golgi apparatus
[✓ B. Lysosomes]
C. Mitochondria
D. SER

Q.59 The inner membrane of mitochondria forms extensive infoldings called: **(MDCAT 2016)**

[✓ A. Cristae]
B. Lamella
C. Cisternae
D. Bifidae

Q.60 The rapid exchange of materials through carrier proteins across the plasma membrane is called: **(MDCAT 2016)**

A. Passive Diffusion
B. Endocytosis
C. Active Transport
[✓ D. Facilitated diffusion]

Q.61 The basic structure of plasma membrane is provided by: **(MDCAT 2016)**

A. Proteins
B. Cytoskeleton
C. Cholesterols
[✓ D. Phospholipids]

Q.62 Out of the given options, choose the one which shows the structures found only in plants? **(MDCAT 2016)**

A. Vacuole, chloroplast, ribosomes
[✓ B. Chloroplast, cell wall, vacuole]
C. Chloroplast, microtubules, peroxisomes
D. Chloroplast, cell wall, mitochondria

Q.63 Presence of large central vacuole is the characteristic of: **(MDCAT 2016)**

A. Prokaryotes
B. Fungi
C. Protists
[✓ D. Plants]

Q.64 The organelle involved in detoxification of drugs and poisons in the liver cells: **(MDCAT 2016)**

[✓ A. Smooth Endoplasmic Reticulum]
B. Golgi apparatus
C. Rough Endoplasmic Reticulum
D. Lysosomes

Q.65 Which one of the following organelle is found in both prokaryotic and eukaryotic cells? (MDCAT 2016)
A. Centriole
B. Nucleus
C. Endoplasmic Reticulum
[✓ D. Ribosome]

Q.66 Select the organelle which is only present in animal cells: (MDCAT 2017)
[✓ A. Centrioles]
B. Microtubules
C. R.E.R
D. Ribosomes

Q.67 Ribosomes present in prokaryotes are: (MDCAT 2017)
A. 80S
B. 50S
C. 60S
[✓ D. 70S]

Q.68 Functionally, mesosomes can be compared with: (MDCAT 2017)
A. Ribosomes
B. Polysomes
[✓ C. Mitochondria]
D. Golgi bodies

Q.69 Which of the following structure is present in both plant and animal cells but is absent in prokaryotic cells? (MDCAT 2017)
[✓ A. Centrioles]
B. Plastids
[✓ C. Microtubule]
D. Sieve tubes

Q.70 DNA molecule in prokaryotes is: (MDCAT 2017)
[✓ A. Single, circular, double stranded molecule not bound by membrane]
B. Double, circular molecule
C. Linear, double stranded molecule
D. Single, circular, double stranded and membrane bound

Q.71 Organelle involved in aerobic respiration: (MDCAT 2017)
[✓ A. Mitochondria]
B. Plastids
C. Lysosome
D. Ribosome

Q.72 Inner membrane of mitochondria is called: (MDCAT 2017)
A. Cisternae
B. Lemma
[✓ C. Cristae]
D. Tonoplast

Q.73 Group of ribosomes attached to mRNA is called: (MDCAT 2017)
A. Polyploid
B. Polynucleotide
[✓ C. Polysome]
D. Polysaccharide

Q.74 Which of the following organelle consist of two subunits? (MDCAT 2017)
A. Golgi body
[✓ B. Ribosome]
C. Mitochondria
D. Plastid

Q.75 Ribosome present in prokaryotes are of: (MDCAT 2017)
[✓ A. 70S]
B. 60S
C. 80S
D. 40S

Q.76 Taking in of solid particle by cell is called: (MDCAT 2017)
[✓ A. Phagocytosis]
B. Exocytosis
C. Pinocytosis
D. Endocytosis

Q.77 Self-eating of lysosomes is called: (MDCAT 2017)
A. Phagocytosis
[✓ B. Autophagy]
C. Pinocytosis
D. Exocytosis

Q.78 Nuclear membrane is continuous with: (MDCAT 2017)
[✓ A. E.R]
B. Lysosome
C. Golgi Body
D. Peroxisome

Q.79 Ribosomal RNA is synthesized in: **(MDCAT 2017)**
[✓ A. Nucleolus] B. Golgi body
C. Peroxisome D. Nucleoplasm

Q.80 Which of these locomotor organs would likely be the shortest? **(ETEA 2017)**
A. A flagellum B. An extended pseudopod
[✓ C. A cilium] D. A pellicle

Q.81 Which of the following is correctly matched? (NTS 2017)

A.	Ribosomes	Detoxification of alcohol
B.	Lysosomes	Formation of astral ray
C.	Centrioles	Protein synthesis
D.	Peroxisomes	Destroyers of foreign particles
[✓ E.]	SER	Converts cholesterol into vitamin D in skin

Q.82 Which features do animal cells share with plant cells? **(NTS 2017)**

	Chloroplast	Cytoplasm	Nucleus	Mitochondria
A.	✓	✓	✓	✓
B.	✓	×	✓	×
[✓ C.]	×	✓	✓	✓
D.	×	×	×	✓

Q.83 Lipid synthesis or lipid metabolism is the function of: **(MDCAT 2018)**
[✓ A. Smooth endoplasmic reticulum] B. Mitochondria
C. Rough endoplasmic reticulum D. Golgi complex

Q.84 Site of protein synthesis in cell is: **(MDCAT 2018)**
[✓ A. Ribosome] B. Nucleolus
C. Endoplasmic reticulum D. Smooth endoplasmic reticulum

Q.85 Ribosomes are made up of __________and_________. **(MDCAT 2018)**
[✓ A. RNA and proteins] B. RNA and carbohydrates
C. RNA and lipids D. Proteins and carbohydrate

Q.86 Tonoplast bounds which organelle: **(MDCAT 2018)**
A. Golgi complex B. Endoplasmic reticulum
C. Nucleus [✓ D. Vacuoles]

Q.87 These structures are involved in the breakdown of old organelles: **(MDCAT 2018)**
A. Leucoplasts B. Glyoxysomes
C. Lysosomes D. Peroxisomes

Q.88 The cisternae break up into vesicles from and of Golgi complex. **(MDCAT 2018)**
A. Convex, forming face B. Convex, maturing face
C. Concave, forming face [✓ D. Concave, maturing face]

Q.89 Which statement is correct about mitochondria and chloroplast? **(MDCAT 2018)**
A. Chloroplast and mitochondria cannot live independently
B. 70S ribosome is attached with the inner membrane of mitochondria and chloroplast
C. Chloroplast and mitochondria are single membrane structure
D. Number of mitochondria and chloroplast are same in all cells

Q.90 Which organelle is required for aerobic respiration? **(NTS 2018)**
A. Plastids [✓ B. Mitochondria]
C. ER D. Nucleus

Q.91 Which of the following is not the function of cell membrane?
A. Protection of cytoplasm
B. Regulating the passage of different molecules
[✓ C. Protein synthesis]
D. Cellular communication
E. Cellular transportation

Q.92 Passive processes for the movement of molecules across cell surface membrane are: **(MDCAT 2019)**

[✓ A. Facilitated diffusion and osmosis]
B. Diffusion and exocytosis
C. Pinocytosis and facilitated diffusion
D. Osmosis and phagocytosis

Q.93 Smooth endoplasmic reticulum is responsible for the metabolism of: **(MDCAT 2019)**

A. Carbohydrates
B. Nucleic acids
C. Proteins
[✓ D. Lipids]

Q.94 Site of protein synthesis is: **(MDCAT 2019)**

[✓ A. Ribosomes]
B. Golgi body
C. Lysosomes
D. Cisternae

Q.95 Which cell organelle is responsible for cell secretion? **(MDCAT 2019)**

A. Mitochondrion
B. Ribosomes
C. Chloroplast
[✓ D. Golgi body]

Q.96 The finger like infoldings which are formed by inner membrane of mitochondria are called: **(MDCAT 2019)**

A. Matrix
[✓ B. Cristae]
C. Porins
D. Ribosomes

Q.97 Among followings which cellular organelle contains circular DNA similar to those found in bacteria? **(MDCAT 2019)**

A. Ribosome
[✓ B. Chloroplast]
C. Lysosome
D. Nucleus

Q.98 The structure present in a eukaryotic cell but absent in prokaryotic cells is: **(MDCAT 2019)**

[✓ A. Nucleus]
B. Ribosomes
C. DNA
D. Cell surface membrane

Q.99 The prokaryotes possess small ribosomes of size: **(MDCAT 2019)**

A. 40S
B. 65S
[✓ C. 70S]
D. 60S

Q.100 The cytoplasmic organelle commonly found both in prokaryotes and eukaryotes is: **(AJK 2019)**

A. Flagellum
[✓ B. Ribosome]
C. Mitochondria
D. Nucleoid

Q.101 The structure in double-membrane bound organelle, primarily involved in ATP generation through cellular respiration is: **(AJK 2019)**

[✓ A. F1-particles]
B. Mitoplast
C. Mitochondria
D. Ergastoplasm

Q.102 The fluid mosaic model of cell membrane is: **(AJK 2019)**

A. Protein layers having scattered phospholipids
B. Phospholipid bilayer is enclosed in protein layer
C. Carbohydrate chains are attached with phospholipid bilayer
[✓ D. In which protein molecules are free to move about in a fluid bilayer of phospholipid molecules]

Q.103 Which of these is solely present in plant cell only? **(AJK 2019)**

A. Peroxisomes
B. Smooth endoplasmic reticulum
C. Cytoskeleton
[✓ D. Central vacuole]

Q.104 Glycolysis is the common stage in both aerobic and anaerobic respiration and it occurs in ________ of the cell. **(AJK 2019)**

A. Inner membrane of mitochondria
B. Mitochondrial matrix
C. Chloroplast
[✓ D. Cytoplasm]

Q.105 When plant cell receives a signal for death, it commits suicide by rupturing: **(NTS 2019)**

A. Nucleus
[✓ B. Cell membrane]
C. Tonoplast
D. Chloroplast

Q.106 Cell permeability and transport processes of cell membrane depend upon its ______ component. **(NTS 2019)**

A. Phospholipid B. Carbohydrate
C. Polysaccharide D. Cellulose

Q.107 In which type of cells, cell wall is not present: **(PMC 2020)**

A. Plant cells B. Bacterial cells
C. Fungal cells D. Liver cells

Q.108 70S sized ribosomes are found in the cells of: **(PMC 2020)**

A. Algae B. Protozoans
C. Fungi D. Bacteria

Q.109 According to the fluid mosaic model of cell membrane, which zone is embedded inside? **(PMC 2020)**

A. Hydrophobic B. Globular
C. Hydrophilic D. Filamentous

Q.110 The membrane separating the vacuole from cytoplasm is called: **(PMC 2020)**

A. Cristae B. Tonoplast
C. Cisternae D. Vacuolar membrane

Q.111 Select the one which is not a function of smooth endoplasmic reticulum (SER): **(PMC 2020)**

A. Metabolism of lipids B. Transport of materials
C. Transmission of impulses D. Processing of glycoproteins

Q.112 Which of the following organelles are involved in the synthesis of plant cell wall? **(PMC 2020)**

A. Endoplasmic reticulum B. Lysosomes
C. Golgi complex D. Peroxisomes

ANSWER KEY

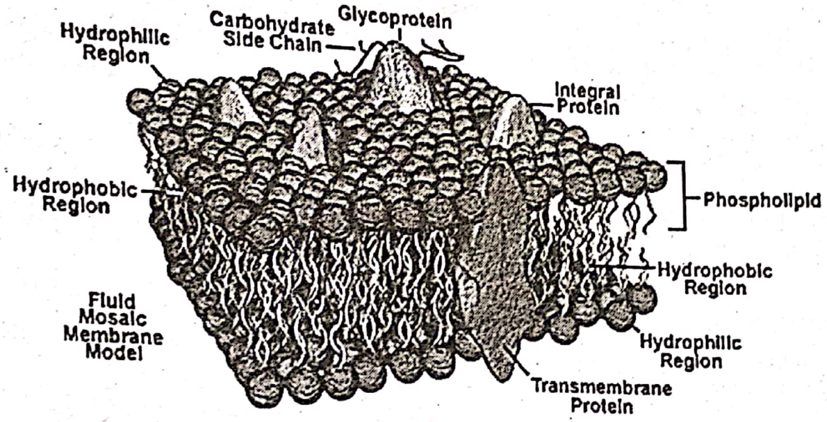
TOPIC-WISE MCQs & PAST PAPER MCQs

1	C	16	B	31	C	46	B	61	D	76	A	91	C	106	A
2	D	17	B	32	A	47	C	62	B	77	B	92	A	107	D
3	B	18	C	33	A	48	C	63	D	78	A	93	D	108	D
4	C	19	C	34	C	49	B	64	A	79	A	94	A	109	A
5	B	20	B	35	C	50	C	65	D	80	C	95	D	110	B
6	B	21	D	36	D	51	B	66	A	81	E	96	B	111	D
7	C	22	D	37	C	52	B	67	D	82	C	97	B	112	C
8	D	23	A	38	A	53	B	68	C	83	A	98	A		
9	D	24	A	39	B	54	C	69	C	84	A	99	C		
10	B	25	B	40	B	55	A	70	A	85	A	100	B		
11	B	26	C	41	C	56	A	71	A	86	D	101	A		
12	A	27	D	42	D	57	C	72	C	87	C	102	D		
13	B	28	A	43	D	58	B	73	C	88	D	103	D		
14	C	29	D	44	B	59	A	74	B	89	B	104	D		
15	B	30	B	45	B	60	D	75	A	90	B	105	B		

EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

1. Cellulose fibers are responsible for strengthening of cell wall of plants in crisscross manner, placing them at right angle with each other gives more strength.
2. Cell wall of prokaryotes is composed of polysaccharide chains bounded to shorter chains of amino acid forming peptidoglycan or murein. The entire cell wall is often regarded as a single huge molecule called sacculus.
3. All are present in secondary cell wall except pectin, as it is component of primary cell wall.
4. Globular proteins, polysaccharides and phospholipids are present in both prokaryotic and eukaryotic cell membranes while cholesterol is present only in eukaryotic cell membrane.
5.



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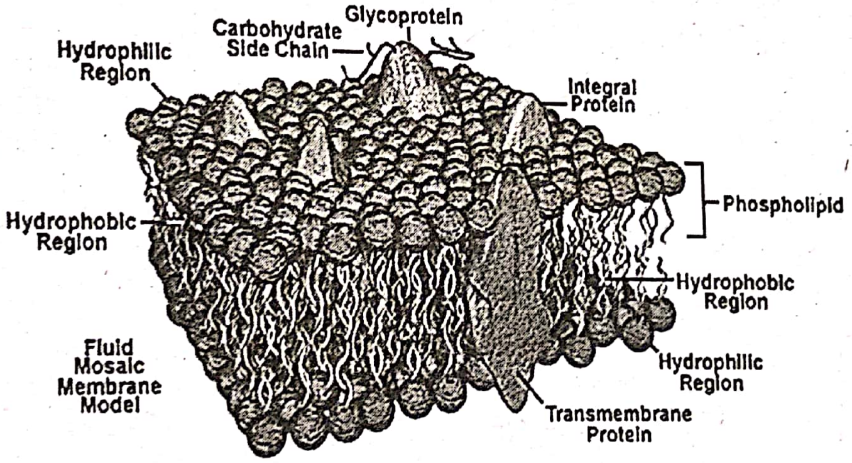
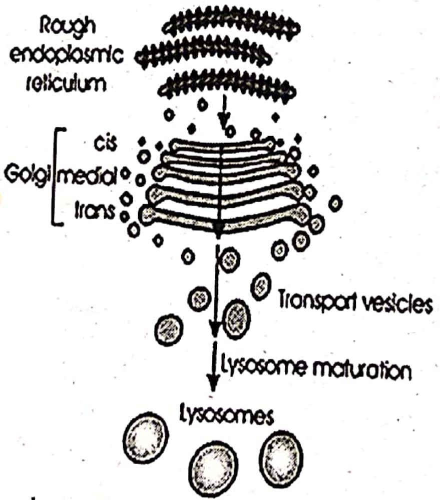


7. Glycolipids and glycoproteins are oriented towards outer surface of plasma membrane and form glycocalyx and act as receptors.
8. The animal cell membrane provides mechanical support, maintain cellular homeostasis, and regulate passage of molecules across the membrane. It does not prevent the animal cell from osmotic lysis, it is the function of cell wall, which is absent in animal cells.
9. Glycoproteins which are present on plasma membrane can act as receptors for hormones and various other molecules.
10. Cell membrane is the most important structure because it is responsible for identity and integrity of the cell.

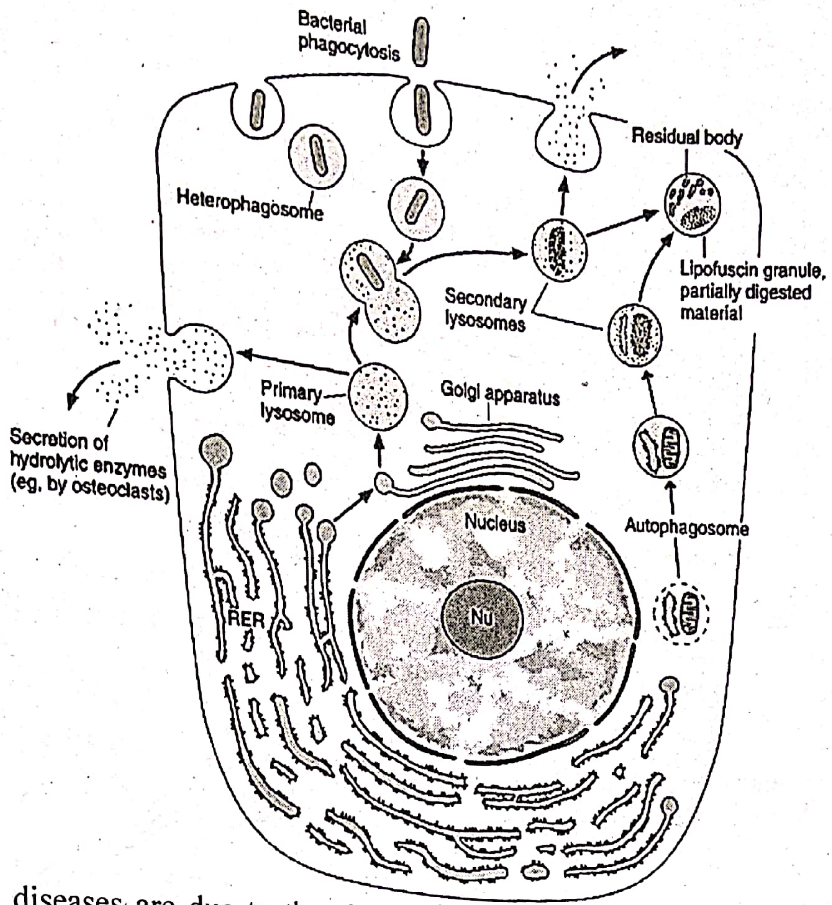
11. Consistency of cytoplasm is both like sol and gel, but peripheral part is more gel like while central is sol like.
12. Nucleus contains linear DNA, chloroplast and mitochondria also have their own circular genomic DNA while ribosomes are made up of rRNA and protein.
13. *E. coli, C. botulinum* and *T. pallidum* are prokaryotic organisms having 30S smaller ribosomal subunit, while yeast is eukaryotic organism having 40S smaller ribosomal subunit and 60S larger sub-unit.
14. Endoplasmic reticulum is single membrane bounded organelle, nucleus and chloroplast both are double membrane bounded organelles, while ribosomes are a non-membranous organelle.
15. Due to presence of ribosomes on RER it involves in protein synthesis, while lipids are synthesized by SER. Ribosomes synthesized by nucleolus.
16. Adipose tissue is concerned with conversion, synthesis and storage of lipids that is why it contains more SER than RER.
17. Calcium storage and steroid synthesis is the function of SER, while enzyme synthesis is the function of RER. Mechanical support is, however, related to both SER and RER.
18. Nucleus, chloroplast and mitochondria are double membranous organelles while endoplasmic reticulum is single membrane organelle.
19. Detoxification of drugs is the function of SER while protein synthesis is the function of RER. Mechanical support, however, is the function of both RER and SER.
20. Mitochondria are responsible for fatty acid metabolism while steroid biosynthesis takes place in SER.
21. DNA replication occurs in nucleus, proteins are synthesized by RER and anaerobic respiration occurs in cytoplasm. Chemical modification of biological molecules is the function of Golgi apparatus.
22. The enzymes required for proteins glycosylation are solely found in lumen of rough endoplasmic reticulum and Golgi complex. Hence, the more appropriate answer is "D". Golgi bodies are center for modifications and packaging.
23.

The Formation of Lysosomes



24. Proteins are synthesized on RER, and then they are transported toward golgi apparatus with the help of SER, where these proteins are modified. Modified proteins are transported out of the cell in the form of secretory vesicles.
25. Lysosomes are most abundant in those cells which are specialized for phagocytic activities, for example neutrophils.

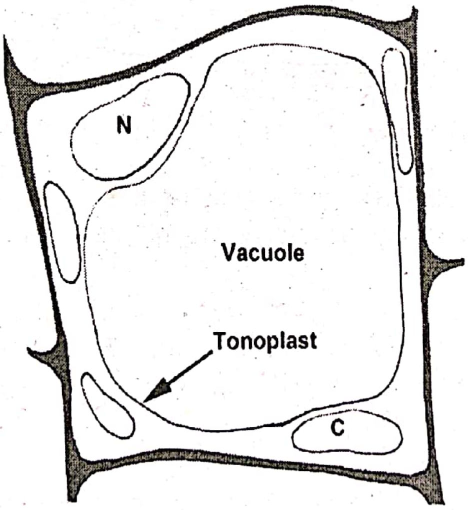
26.



27. Storage diseases are due to the absence of lysosomal enzymes. If a lysosomal enzyme responsible for lipid metabolism is absent, it leads to the accumulation of lipids in brain cells which causes mental retardation and death, such storage disease is known as Tay-Sach's disease.

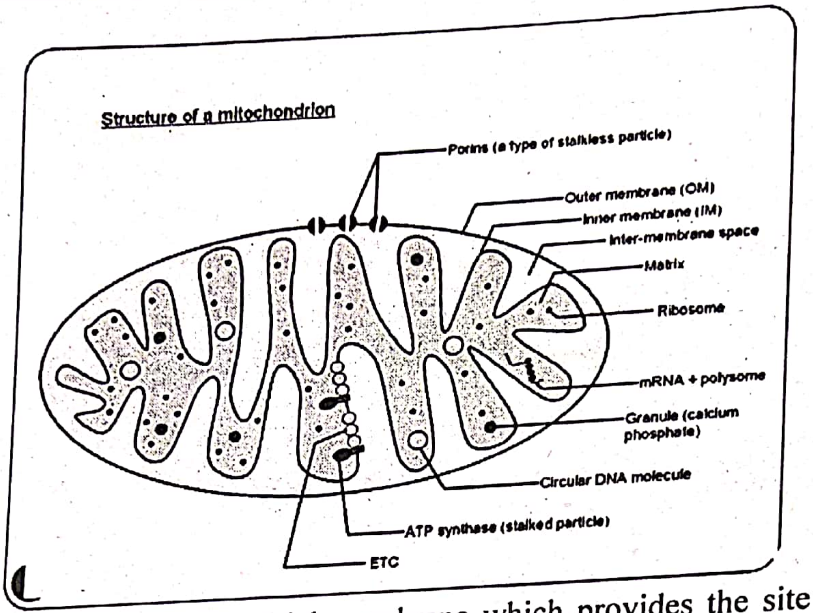
28. Vacuoles provide support for the individual plant cell and contribute to the turgidity of the leaves and younger parts of the plants.

29.



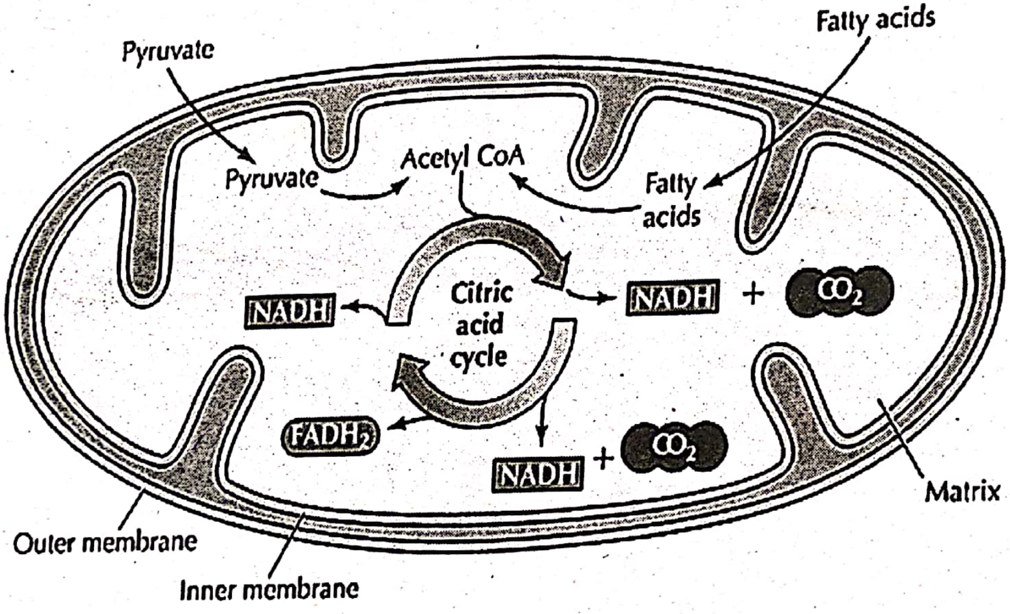
30. Due to large size of mitochondria as compared to endoplasmic reticulum, Golgi apparatus and ribosomes, it can be visualized easily with the help of light microscope.

31.


Structure of a mitochondrion
Porins (a type of stalkless particle)
Outer membrane (OM)
Inner membrane (IM)
Inter-membrane space
Matrix
Ribosome
mRNA + polysome
Granule (calcium phosphate)
Circular DNA molecule
ATP synthase (stalked particle)
ETC

32. ETC occurs in inner mitochondrial membrane which provides the site for pumping of protons across it. Oxidative phosphorylation is associated with ETC.

33.



34. Mitochondria are most abundant in muscle cells because of the strenuous metabolic activities. *E. coli* is a prokaryotic organism and lack mitochondria. RBC's also lack mitochondria.

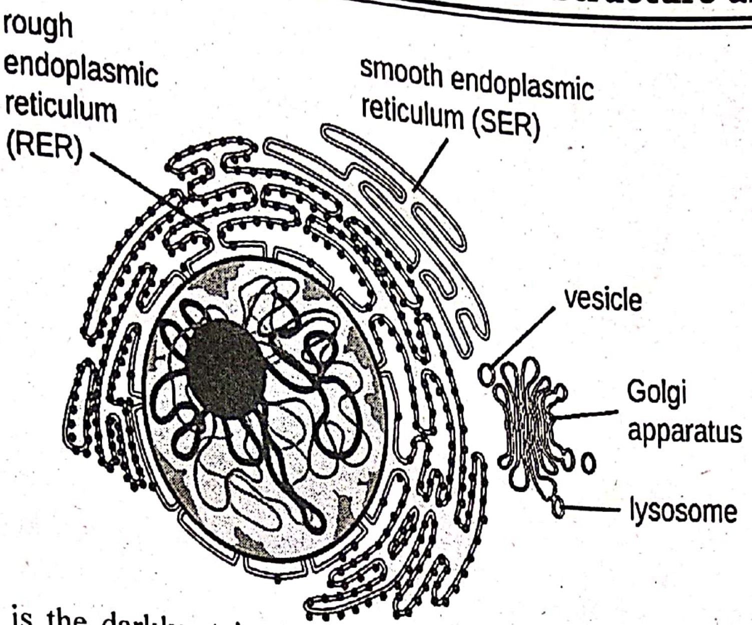
35. Two most important organelles e.g. chloroplast and mitochondria, are thought to be originated from prokaryotes and are explain with the help of endosymbiont hypothesis.

36. The only difference between chlorophyll and haemoglobin is that chlorophyll has Mg^{++} while haem has Fe^{++} as the central atom.

37. Inter-granum is non green part that connects two grana. The process of photosynthesis does not occur in inter-granum because of absence of chlorophyll.

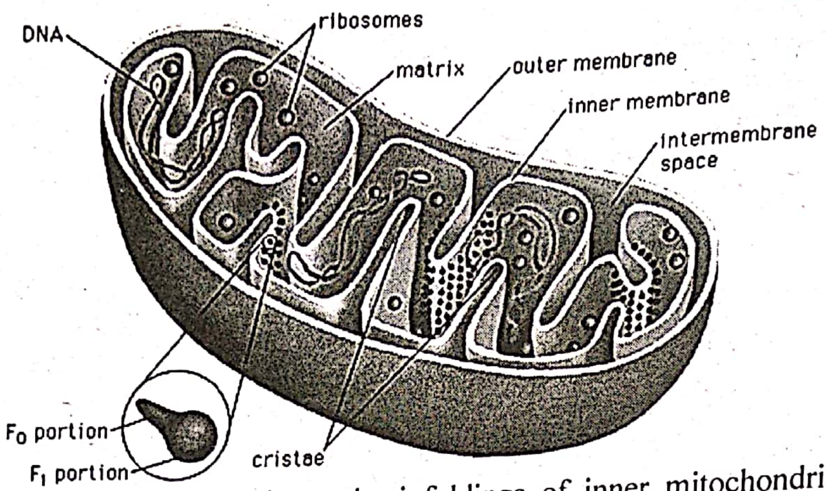
38. Nucleus and nucleolus are visible during interphase only because in mitotic phase, nuclear envelope disintegrates and mixing of nuclear contents with cytoplasm does occur.

39.


rough endoplasmic reticulum (RER)
smooth endoplasmic reticulum (SER)
vesicle
Golgi apparatus
lysosome

40. Nucleolus is the darkly stained area within the nucleus and without any membranous boundary to separate it from the rest of the nuclear material. These are said to be the factory of ribosomes while ribosomes are said to be the factory of protein synthesis.
41. The rRNA is synthesized and stored in nucleolus. Central fibril area of nucleolus has large molecular weight RNA and rDNA.
42. Number of nuclear pores is more in undifferentiated cells as compared to differentiated cells. Since RBCs are fully differentiated cells so they have 3-4 nuclear pores, but the number of nuclear pores in egg cells is about 30,000.
43. Plants contain cell wall as outer most membrane whereas in animal cell it is absent.
44. Centrioles are absent in higher plant cells.
45. Prokaryotic cells may have arisen more than 3.5 billion years ago while eukaryotes are thought to have first appeared about 1.5 billion years ago.
46. Besides nuclear envelope, the main difference between prokaryotic and eukaryotic cell is the absence of membrane bounded organelles.
47. Both prokaryotic and eukaryotic cells have ribosomes while membrane bound nucleus, cellulosic cell wall and linear chromosomes are found only in eukaryotic cells.
48. The most distinguished feature of a prokaryotic cell is its cell wall and chemically, it is composed of carbohydrates and short peptides. This complex molecule is called peptidoglycan/murein.
49. The ingestion of liquid material into a cell by the budding of small vesicles from the cell membrane is called pinocytosis while the process by which certain living cells called phagocytes ingest or engulf other cells or solid particles.
50. Golgi complex is considered as secretory organelle of the cell. Secretory proteins are synthesized on RER, then transferred to Golgi apparatus through SER for final processing and packaging and finally released as secretory vesicles.

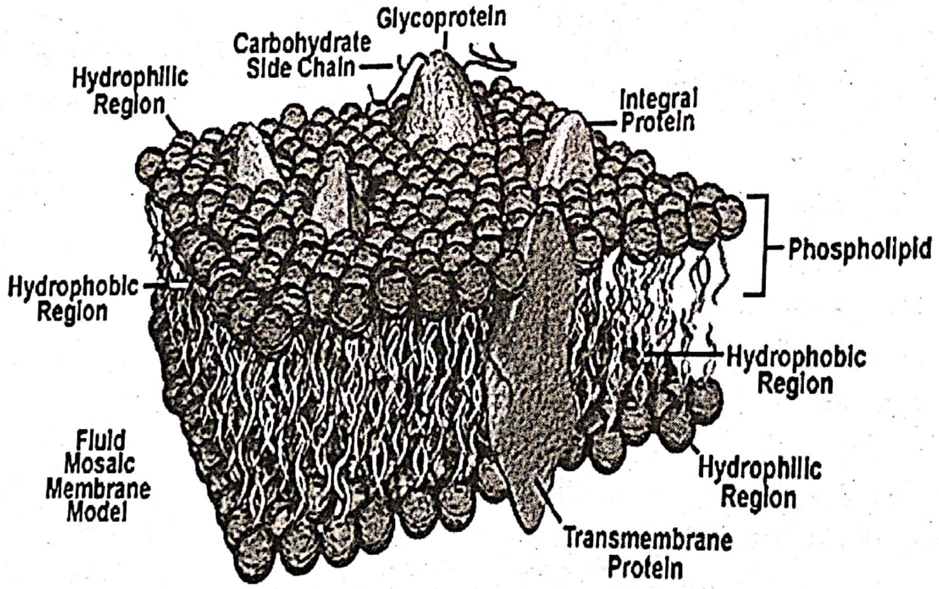
51.



F_1 particles are located on cristae, the infoldings of inner mitochondrial membrane. F_1 particle is actually ATP synthase which plays role in synthesis of ATP through chemiosmosis.

52. Bacteria cell wall is made up of peptidoglycan which has glycan with short chain of amino acids. Fungi cell wall is made up of chitin, while plants have cellulose in their cell wall.

53.



54. Fluid mosaic model of the plasma membrane described the arrangement of phospholipids in two layers, stabilized interiorly by the hydrophobic interactions while hydrophilic interactions at intracellular and extracellular faces with embedded proteins randomly.

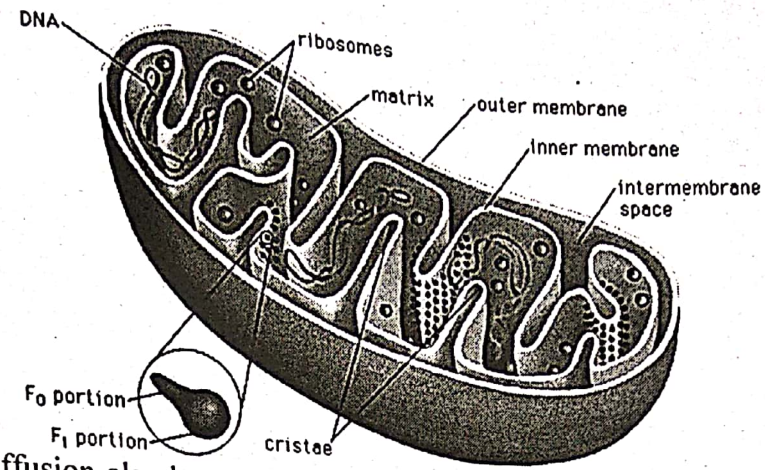
55. Ribosomes are factory of protein synthesis; nucleolus is a factory of ribosomes synthesis.

56. Mitochondria are responsible for fatty acid catabolism while lipid synthesis takes place in SER.

57. Mitochondria, chloroplast and nucleus are double membrane bounded organelles. Lysosomes, Golgi complex, endoplasmic reticulum and micro-bodies are single membranous organelles while ribosomes lack membrane.

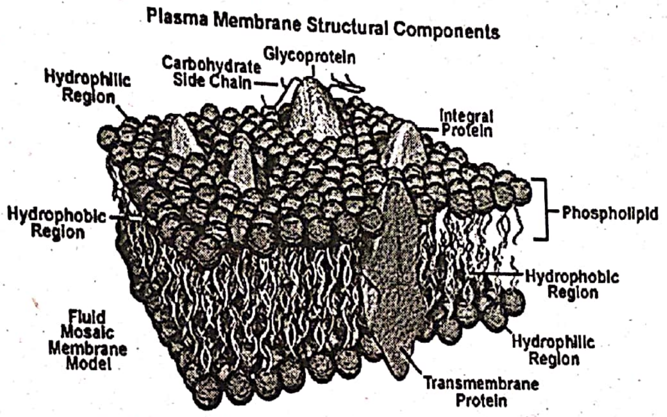
58. Tay–Sachs disease is a genetic disorder that results in the destruction of nerve cells in the brain and spinal cord. It is due to deficiency of lipids digesting enzyme in body.

59.



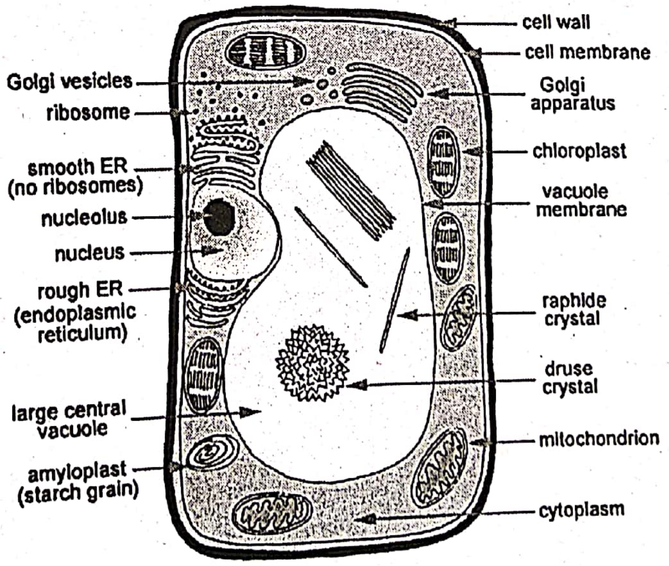
60. Facilitated diffusion also known as facilitated transport or passive-mediated transport, is the process of spontaneous passive transport of molecules or ions across a biological membrane via specific trans-membrane integral proteins.

61.



62. Chloroplast, cell wall and large central vacuole are the organelles which are absent in an animal cells but present in plant cells.

63.



64. The detoxification of drugs is the function of SER while protein synthesis is the function of RER. Mechanical support, however, is the function of both RER and SER.

65. Membrane bounded organelles are absent in prokaryotic cells but present in eukaryotic cells. Ribosomes are non-membranous and are present in both prokaryotic and eukaryotic cells.

66. Centrioles are present only in animal cell but RER, microtubules and ribosomes are present in both animal and plant cells.

67. The size of the ribosomes present in prokaryotic and eukaryotic cells is 70S and 80s, respectively. 70S ribosomes are, however, present in some eukaryotic organelles like mitochondria and chloroplasts.

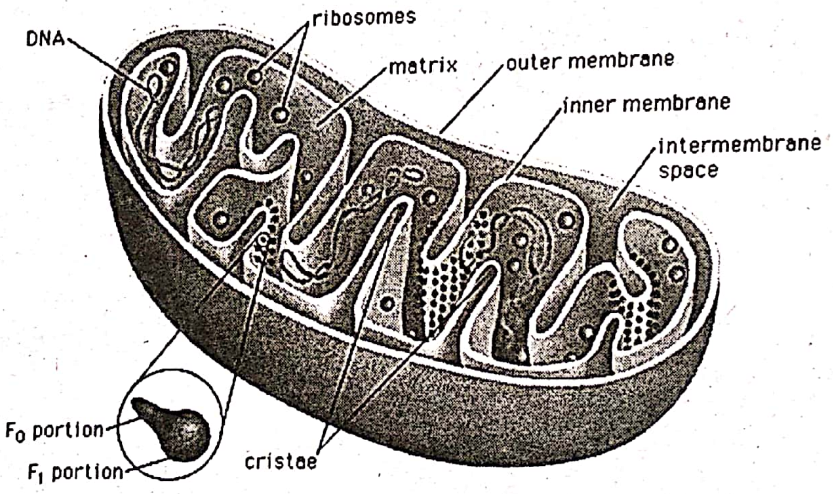
68. Mesosomes are membrane infoldings in bacterial cell and are more prominent in Gram negative bacteria. Mesosomes are the sites of cellular respiration. Electron transport chain occurs in mesosomes as mitochondria is absent in bacteria.

69. Mitotic and meiotic cell divisions are absent in bacterial cells instead bacterial cells divide through binary fission. Microtubules are responsible for spindle formation and these ensure mitosis and meiosis in eukaryotic cells.

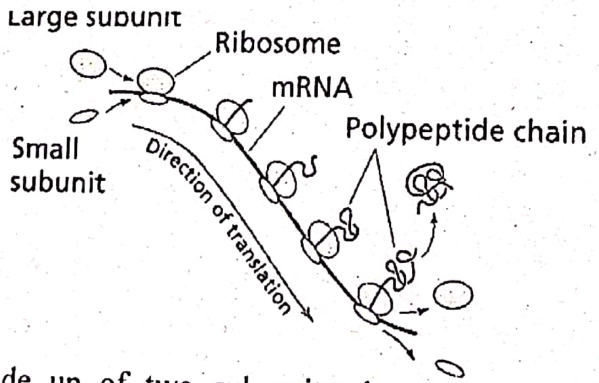
70. Genomic DNA molecules in prokaryotes is single, circular, double stranded and not bounded by any membrane and it is freely dispersed in cytoplasm.

71. Mitochondria are power house of a cell. Aerobic cellular respiration takes place in mitochondria.

72.



73.



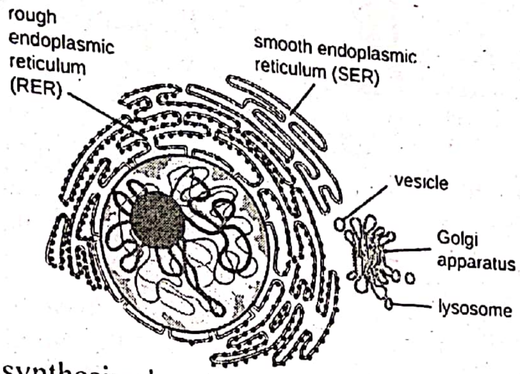
74. A ribosome is made up of two sub-units, larger and smaller subunits. In case of eukaryotic cell, larger subunit is 60S and smaller subunit is 40S while prokaryotic cell has 50S and 30S larger and smaller sub-units, respectively.

75. Smaller ribosomes (70S) are present in prokaryotic cell but larger ribosomes (80S) are present in eukaryotic cells.

76. Phagocytosis is the process by which a cell uses its plasma membrane to engulf a large solid particle, giving rise to an internal compartment called the phagosome. It is one type of endocytosis while pinocytosis, otherwise known as fluid endocytosis is a mode of endocytosis in which small particles suspended in extracellular fluid are brought into the cell through an invagination of the cell membrane, resulting in a suspension of the particles within a small vesicle inside the cell.

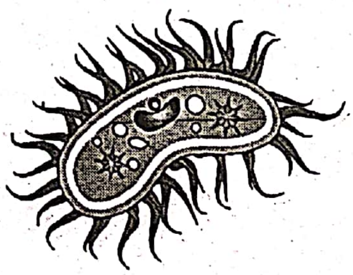
77. Autophagy is the natural, regulated mechanism of the cell that removes unnecessary or dysfunctional components. It allows the orderly degradation and recycling of cellular components with the help of lysosomes.

78.


rough endoplasmic reticulum (RER)
smooth endoplasmic reticulum (SER)
vesicle
Golgi apparatus
lysosome

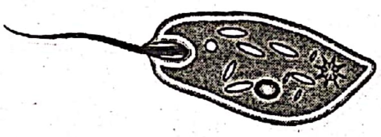
79. Ribosomal RNA is synthesized and stored in nucleolus. Central fibril area of nucleolus has large molecular weight RNA and rDNA.

80.



CILIA

CILIA ARE SLENDER PROTUBERANCES THAT PROJECT FROM THE MUCH LARGER CELL BODY



FLAGELLA

A FLAGELLA IS A LASH-LIKE APPENDAGE THAT PROTRUDES FROM THE CELL BODY

81.

A	Ribosomes	Protein synthesis
B	Lysosomes	Destroyers of foreign particles
C	Centrioles	Formation of astral ray
D	Peroxisomes	Hydrogen peroxide formation and decomposition
E	SER	Converts cholesterol into vitamin D in skin

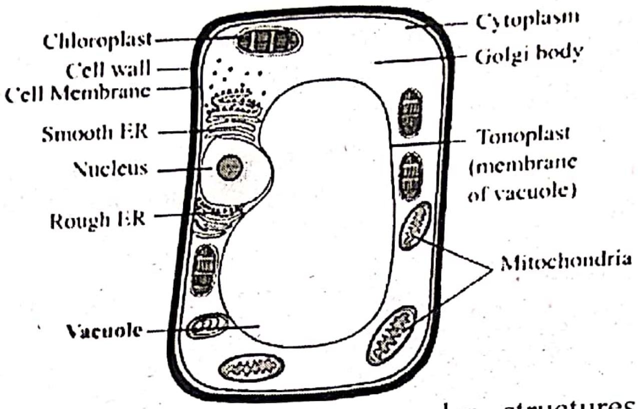
82. Chloroplast is not present in animal cells, while nucleus, cytoplasm and mitochondria are present in both plants and animal cells.

83. SER is responsible for lipid metabolism, detoxification, nerve impulse conduction and transport of material in the cell.

84. Ribosome is the factory of protein synthesis. But the factory of ribosomes synthesis is nucleolus.

85. Chemically ribosomes are composed of an almost equal amount of RNA and proteins; hence they are ribonucleo-protein particles.

86.



87. Lysosomes are membrane bound, dense granular structures containing hydrolytic enzymes responsible mainly for intracellular and extracellular digestion.

88. Maturing, concave and inner face of the Golgi complex is the site from where Golgi vesicles after processing are budded off.

89. Mitochondria and chloroplasts both are considered as semiautonomous organelles, as they have their own circular DNA and 70S ribosomes. Mitochondria are present in both plant and animal cells but chloroplast is present in autotrophic eukaryotes.

90. Different types of pastids involve in sugar synthesis, storage and pollination in plants. ER involve in proteins and lipids synthesis, while nucleus is the brain of cell which control all of its activities.

91. Protein synthesis is the function of ribosomes.

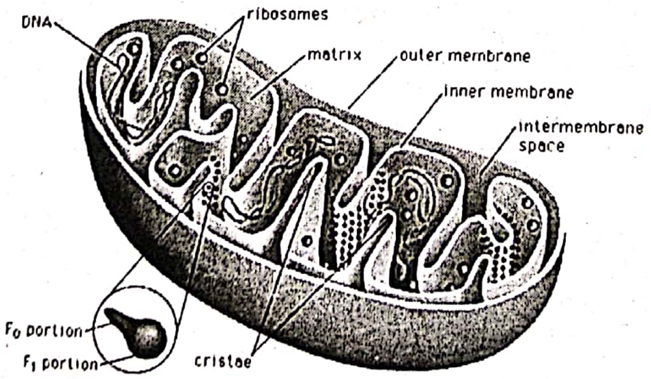
92. Osmosis, diffusion and facilitated diffusion are passive processes of passage of molecules across the cell membrane but exocytosis and endocytosis are active processes of molecules across the cell.

93. SER is responsible for lipid metabolism, detoxification, nerve impulse conduction and transport of material in the cell.

94. Ribosome is the factory of protein synthesis. But the factory of ribosomes is nucleolus.

95. Golgi complex is considered as secretory organelle of the cell. Secretory proteins are synthesized on RER, then transferred to Golgi apparatus through SER for final processing and packaging and finally released as secretory vesicles.

96.



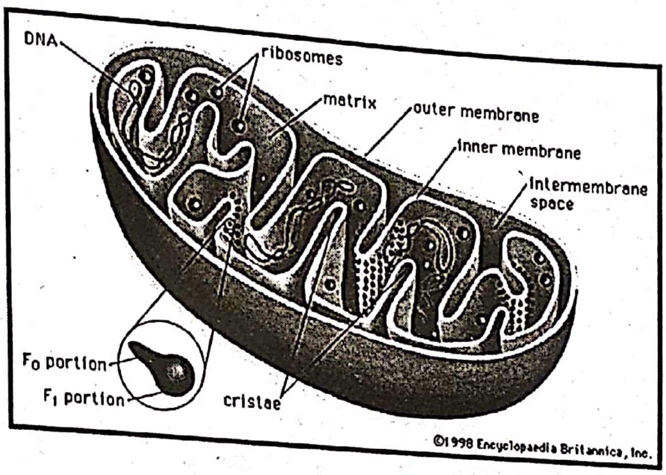
97. Mitochondria and chloroplasts both are considered as semiautonomous organelles, as they have their own circular DNA and 70S ribosomes. Mitochondria are present in both plant and animal cells but chloroplast is present in autotrophic eukaryotes.

98. The term 'prokaryotes' is derived from the Greek word 'pro-meaning before' and 'karyon meaning nucleus'. Prokaryotic cells are cells that do not have a true nucleus and membrane-bound organelles.

99. Smaller ribosomal (70S) present in prokaryotic cell but larger ribosomes (80S) are present in eukaryotic cells.

100. Prokaryotes lack membrane bounded organelles. Ribosomes are non-membranous organelle which present in both prokaryotes and eukaryotes.

101.



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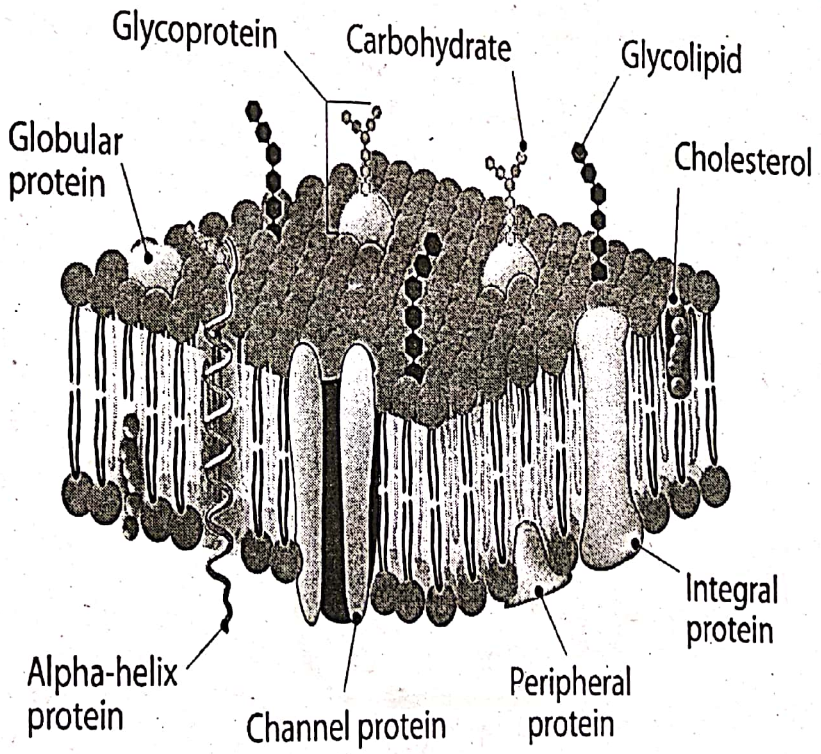
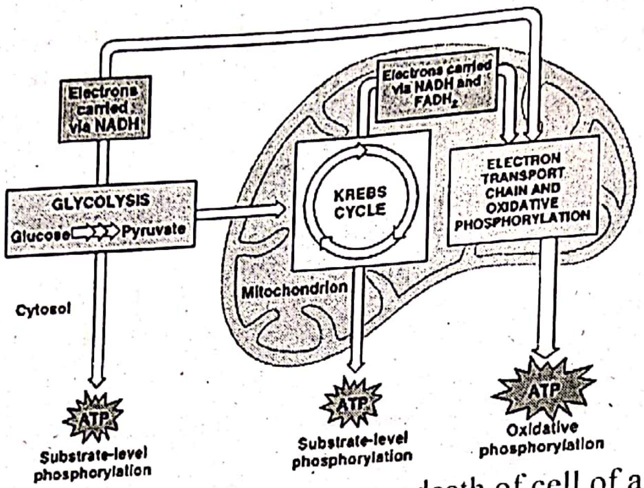
102.



103. Plants cell have single central large vacuole while animal cells have many small vacuoles

104.


Electrons carried via NADH
Electrons carried via NADH and FADH$_2$
GLYCOLYSIS
Glucose → Pyruvate
KREBS CYCLE
ELECTRON TRANSPORT CHAIN AND OXIDATIVE PHOSPHORYLATION
Cytosol
Mitochondrion
ATP
Substrate-level phosphorylation
ATP
Substrate-level phosphorylation
ATP
Oxidative phosphorylation

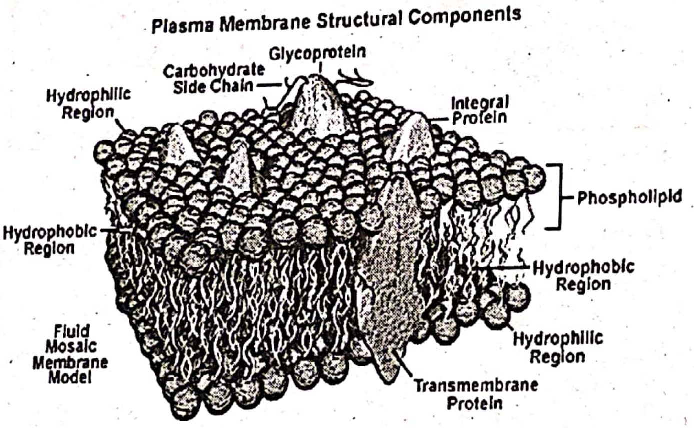
105. Any type of damage in cell membrane can cause death of cell of an organism.

106. Permeability of membrane depend upon phospholipids in plasma membrane.

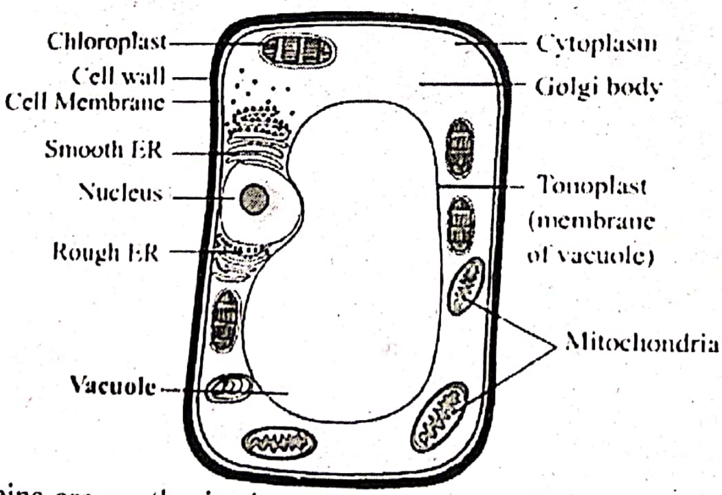
107. In animal cells the outer most boundary is cell membrane, where as in plants it is cell wall.

108. Eukaryotes contain 80S in general, 70S is found in prokaryotes.

109.



110.



111. Secretory proteins are synthesized on RER, then transferred to Golgi apparatus through SER for final processing and packaging and finally released as secretory vesicles.

112. Plant cell wall is secreted by the vesicles formed from Golgi complex.

5 TOPIC

COORDINATION & CONTROL NERVOUS & CHEMICAL COORDINATION

PRACTICE EXERCISE

TOPIC-WISE MCQs

Q.1 Spinal cord terminates at the level of:
A. Sacrum
B. Coccyx
C. 1st Lumber vertebra
[✓ D. 2nd Lumber vertebra]

Q.2 Information received by different receptors of body is analyzed by:
A. Autonomic nervous system
[✓ B. Central nervous system]
C. Parasympathetic nervous system
D. Sympathetic nervous system

Q.3 Sense of hearing is concerned with:
[✓ A. Cerebral cortex]
B. Medulla
C. Hypothalamus
D. Cerebellum

Q.4 Ectoderm mainly gives rise to:
A. Musculo-skeletal system
[✓ B. Nervous system]
C. Respiratory system
D. Cardiovascular system

Q.5 Pressure is felt by your body immediately after it is applied This is achieved with the help of:
[✓ A. Mechanoreceptors]
B. Thermoreceptors
C. Nociceptors
D. Chemoreceptors

Q.6 Stimulus of touch, pain, cold and heat are recognized differently because:
A. For each sensation, different form of nerve impulse is generated
[✓ B. Different receptors are present for detection of stimuli]
C. All nerves send their impulse to same part of brain
D. Each stimulus acts on different parts of body

Q.7 Non-neuronal cells encapsulating mainly axons of peripheral neurons are:
A. Microglia
B. Oligodendrocytes
C. Astrocytes
[✓ D. Schwann's cell]

Q.8 Myelinated, single and long fiber that takes message towards the cell body is:
[✓ A. Dendron]
B. Axon
C. Dendrite
D. Soma

Q.9 A motor nerve carries impulses from:
A. Spinal nerves to effectors
B. Effectors to cranial nerves
C. Effectors to CNS
[✓ D. CNS to effectors]

Q.10 The largest number of the cell bodies of neurons are found in:
[✓ A. Brain]
B. Spinal cord
C. Sensory organs
D. Effectors

Q.11 Which of the following is not correct about myelin sheath?
A. Composed of specialized lipids
B. Responsible for saltatory conduction
[✓ C. Conduct impulses]
D. Absent on nodes of Ranvier

Q.12 Myelin sheath:
A. Is found in all axons
B. Is found in all dendron
[✓ C. Speeds up conduction]
D. Is proteinaceous

Q.13 Which one of the following are also known as efferent neurons?
A. Sensory
B. Associative
[✓ C. Motor]
D. Mixed

Q.14 Regeneration is possible in all parts of neurons except:
A. Dendron
B. Axon
C. Dendrites
[✓ D. Cell body]

Q.15 Grey matter is composed of:
A. Schwann cells
B. Neuron fibres
[✓ C. Cell bodies of neuron]
D. Nissl's granules

Q.16 It is not true about cell body of neuron:
A. Main nutritional part
[✓ B. It contains axoplasm]
C. Biosynthesis of materials
D. Regenerate axonal and dendrite fiber

Q.17 Which organelle cannot be found in synaptic knob of a neuron?
A. Mitochondria
B. Ribosomes
C. Secretory vesicles
[✓ D. Nucleus]

Q.18 Which of the following is most abundant type of neurons in CNS?
A. Sensory neurons
[✓ B. Associate neurons]
C. Motor neurons
D. Neuroglial cells

Q.19 Which one of the following gives a tree-like appearance to neurons?
A. Dendron
B. Soma
[✓ C. Dendrites]
D. Axons

Q.20 Which of the following is not a part of neuron?
A. Axon
B. Dendrons
C. Nissl's granules
[✓ D. Synapse]

Q.21 Which of the following is not a component of reflex arc?
A. Afferent nerve
B. Brain
C. Efferent nerve
D. Effectors

Q.22 The primary function of spinal cord is to:
A. Produce CSF
B. Produce hormones
C. Communicate two hemispheres
[✓ D. Communicate brain with rest of body]

Q.23 Which of the following describes the comprehensive pathway of reflex arc?
A. Prick on finger → Sensory nerve → Medulla → Motor nerve → Arm Muscle
[✓ B. Prick on finger → Sensory nerve → Spinal cord → Motor nerve → Finger muscles]
C. Prick on finger → Sensory nerve → Cerebrum → Motor nerve → Finger muscle
D. Prick on finger → Sensory nerve → Cerebellum → Motor nerve → Finger muscle

Q.24 Depolarization is the result of:
A. Influx of K^+
[✓ B. Influx of Na^+]
C. Efflux of K^+
D. Efflux of Na^+

Q.25 Which of the following causes the hyperpolarization across neurolemma?
A. Distribution of charge
B. Influx of Na^+
[✓ C. Late closing of K^+ channels]
D. Outward diffusion of Na^+

Q.26 Which one of the following sets of ions is necessary for transmission nerve impulse?
[✓ A. Na^+ and K^+]
B. Ca^{2+} and Na^+
C. Ca^{2+} and K^+
D. Na^+ and Mg^{2+}

Q.27 Which of the following will restore original ion gradients and RMP after hyperpolarization in neurons?
A. K^+ channels
[✓ B. Na^+/K^+ pumps]
C. Na^+ channels
D. Ca^{++} channels

Q.28 Microscopic gap between the neurons is called:

[✓ A. Synapse]
B. Synaptic cleft
C. Collapse
D. Pre-synapse membrane

Q.29 Which ion is involved in release of Acetylcholine from pre-synaptic fiber into extracellular fluid?

[✓ A. Calcium]
B. Potassium
C. Sodium
D. Magnesium

Q.30 Neurotransmitter molecule binds to receptors that are located on:

A. Synaptic knob
B. Pre-synaptic membrane
[✓ C. Post synaptic membrane]
D. Synaptic cleft

Q.31 After the depolarization of post synaptic neurolemma, neurotransmitters are mostly:

A. Taken up by Schwann cells
B. Remain in synaptic cleft
[✓ C. Degraded by enzymes]
D. Taken up by post synaptic membrane

Q.32 Which of the following acts as a messenger in both chemical and nervous coordination?

A. Acetylcholine
B. Nicotine
C. Dopamine
[✓ D. Epinephrine]

Q.33 The incorrect statement regarding hormones is:

A. Endocrine secretion
[✓ B. Initiate biochemical reaction]
C. Organic in nature
D. Transported by blood

Q.34 Which one of the following gland produces steroidal hormones?

A. Pancreas
B. Gut
C. Hypothalamus
[✓ D. Testes]

Q.35 Cholesterol serves as precursor of:

A. Proteins hormones
[✓ B. Steroid hormones]
C. Adenoid hormones
D. Glucocorticoids hormones

Q.36 Pick the system which transports hormone in the body:

A. Endocrine system
B. Nervous system
[✓ C. Circulatory system]
D. Muscular system

Q.37 What results in production of large quantities of urine and great thirst?

A. Lack of aldosterone
B. Lack of oxytocin
[✓ C. Lack of ADH]
D. Over-secretion of oxytocin

Q.38 Hypothalamus produces all of the following except:

A. CRF
B. TRF
C. ADH
[✓ D. ACTH]

Q.39 Which of the following option correctly depicts neuro-secretory hormone?

[✓ A. Oxytocin and ADH]
B. ACTH and LH
C. ICSH and TRF
D. TSH and STH

Q.40 The pituitary gland is also called as:

A. Adenohypophysis
[✓ B. Hypophysis cerebri]
C. Neurohypophysis
D. Epiphyses cerebri

Q.41 Term master gland is used for:

[✓ A. Anterior pituitary]
B. Median pituitary
C. Posterior pituitary
D. Pituitary gland

Q.42 High level of TSH can be seen in all conditions except:

A. Stress
B. Low thyroxin in blood
C. Growth and development
[✓ D. Low TRF level]

Q.43 All of the following are releasing factor except:
A. CRF
B. TRF
[✓ C. PIF]
D. SRF

Q.44 Hyper functioning of anterior pituitary causes all except:
A. Hyperthyroidism
B. Gigantism
C. Hypercortical steriodism
[✓ D. Diabetes insipidus]

Q.45 Which one of the following is not a tropic hormone?
A. TSH
B. GH
C. ACTH
[✓ D. ADH]

Q.46 High level of MSH can be seen in all except:
A. Addison's disease
B. Pregnancy
C. Strong light
[✓ D. Cushing disease]

Q.47 Active thyroxin is also called:
A. T1
B. T2
C. T3
[✓ D. T4]

Q.48 Hormones involve in ossification of bones:
[✓ A. Calcitonin]
B. Oxytocin
C. Thyroxin
D. Parathormone

Q.49 High level of TSH can be seen in all conditions except:
A. Stress
B. Growth
C. Brain differentiation
[✓ D. High thyroxin level in blood]

Q.50 Brain cells fail to differentiate in:
[✓ A. Cretinism]
B. Dwarfism
C. Grave's disease
D. Addison's disease

Q.51 Metamorphosis in amphibians is under control of:
A. Sex hormones
B. Pituitary hormone
[✓ C. Thyroid hormone]
D. Parathyroid hormone

Q.52 Due to hypersecretion of thyroxin, there is increased BMR and exophthalmic goiter. This occurs in:
A. Addison's disease
[✓ B. Grave's disease]
C. Cushing's disease
D. Diabetes mellitus

Q.53 Tetany is a serious muscle`s disorder which is due to under secretion of:
A. Calcium
[✓ B. Parathormone]
C. Secretin
D. Vasopressin

Q.54 Parathormone is related to metabolism of Ca^{2+} ions and it is antagonistic to:
A. Calcium
[✓ B. Calcitonin]
C. Aldosterone
D. ADH

Q.55 Most portion of pancreas acts as:
A. Endocrine
[✓ B. Exocrine]
C. Mesocrine
D. Autocrine

Q.56 Which of the following statement is incorrect regarding insulin?
A. Inhibit glycogen hydrolysis
B. Increase glycolysis
C. Convert glucose to protein
[✓ D. Increase lipolysis]

Q.57 All are functions of glucagon except:
A. Glucogensosis
B. Gluconeogenesis
C. Lipolysis
[✓ D. Protein synthesis]

Q.58 Major endocrine cells in pancreas are:
A. Alpha cells
[✓ B. Beta cells]
C. Gamma cells
D. Delta cells

Q.59 Release of hormones from islets of Langerhans is under the influence of:
A. STH
B. ACTH
C. Blood glucose level
[✓ D. All A, B and C]

Q.60 Tumor in beta cells result in all except:
A. More insulin production
B. Low glucose in blood
C. Destruction of alpha cells
[✓ D. Low calcium in blood]

Q.61 Which one of the following is only glucocorticoid?
[✓ A. Cortisol]
B. Aldosterone
C. Corticosterone
D. Androgen

Q.62 Which one of the following is exclusively a mineralocorticoid?
A. Cortisol
[✓ B. Aldosterone]
C. Corticosterone
D. Androgen

Q.63 One which is not due to adrenal cortical abnormality:
A. Addison's disease
B. Cushing disease
C. Failure to cope stress
[✓ D. Tay-Sach's disease]

Q.64 A tumor in inner part of adrenal cortex in female result in all except:
[✓ A. Sterility]
B. Male like character in female
C. Over androgen production
D. High steroid level in blood

Q.65 Action of epinephrine and nor-epinephrine differ on vessels supplying blood to:
A. All parts of body
[✓ B. Skin and gut]
C. Brain and muscles
D. Skin and muscles

Q.66 Stress conditions such as cold which normally be overcome, leads to collapse and death in:
A. Cushing's disease
[✓ B. Addison's disease]
C. Diabetes
D. Cretinism

Q.67 Adrenalin and nor-adrenalin promote the release of glucose from the liver:
A. Protein
B. Fats
[✓ C. Glycogen]
D. Starch

Q.68 If estrogen is deficient then possible reason would be less amount of:
A. Testosterone
[✓ B. FSH]
C. Oxytocin
D. ICSH

Q.69 In castrated male, there is under-secretion of:
[✓ A. Testosterone]
B. FSH
C. LTH
D. STH

Q.70 Testosterone is involved in production of primary sex organ in male:
[✓ A. Before birth]
B. After puberty
C. After birth
D. Before puberty

Q.71 Estrogen is produced from all except:
[✓ A. Developing follicle]
B. Maturing follicle
C. Follicle under FSH
D. Ruptured follicle

Q.72 A significant constant level of testosterone can be seen in male:
A. Before birth
[✓ B. After puberty]
C. After birth
D. Before puberty

Q.73 The hormones which works mostly on the basis of positive feedback mechanism:
A. ADH
B. Insulin
[✓ C. Oxytocin]
D. Aldosterone

Q.74 Normal serum level of hormones is controlled by:
A. Target site [✓ B. Feedback mechanism]
C. Effector's response D. Precursor activation

PAST PAPER MCQs

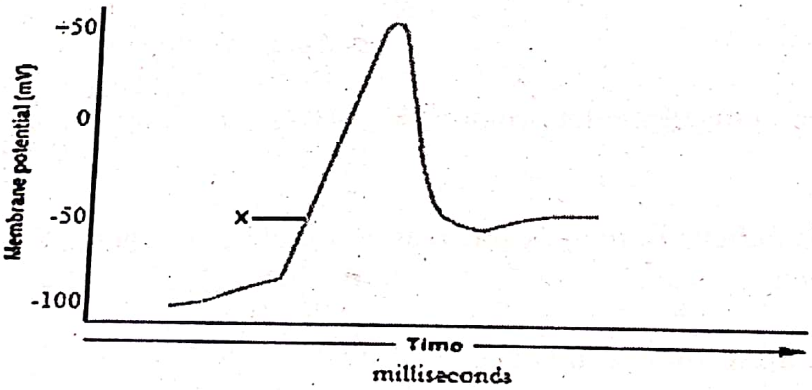
Q.75 Which one of the following is a steroid hormone? **(MDCAT 2014)**
A. Glucagon B. Epinephrine
C. Thyroxin [✓ D. Estrogen]

Q.76 Conduction of action potentials from one node of Ranvier to another in myelinated neurons is through: **(MDCAT 2015)**
A. Hyperpolarization B. Depolarization
C. Resting Membrane Potential [✓ D. Saltatory Conduction]

Q.77 Epinephrine and norepinephrine are hormones produced by: **(KMDC 2014)**
A.Adrenal cortex [✓ B. Adrenal medulla]
C.Pineal gland D. Thymus gland:

Q.78 Destruction of all beta cells in the pancreas would cause: **(LUMMHC 2014)**
A. Glucagon secretion to stop and a decrease in blood glucose
B. Glucagon secretion to stop and an increase in blood glucose
[✓ C. Insulin secretion to stop and an increase in blood glucose]
D. Insulin secretion to stop and a decrease in blood glucose
E. Insulin secretion to increase and a decrease in blood glucose

Q.79 In the following diagram of action potential in a neuron, 'x' depicts: **(MDCAT 2015)**
[✓ A. Depolarization] B. Repolarization
C. Polarization D. Hyperpolarization



Q.80 Neurotransmitter secreted at synapse outside the central nervous system is: **(MDCAT 2015)**
A. Dopamine B. Androgen
C. Polypeptide [✓ D. Acetylcholine]

Q.81 α-cells of pancreas secrete a hormone known as: **(MDCAT 2015)**
[✓ A. Glucagon] B. Gastrin
C. Insulin D. Rennin

Q.82 For the impulse to transfer from presynaptic to post synaptic neuron, the substance required is: **(LUMMHC 2015)**
A. Sodium B. Potassium
C. Protein [✓ D. Calcium]

Q.83 Which of the following is not secreted by thyroid gland?
A. Thyroxin B. Triiodothyonine
C. Calcitonin [✓ D. Glucagon]

Q.84 ________**hormone is antagonistic to insulin and causes increase in blood glucose level.** **(MDCAT 2016)**

[✓ A. Glucagon]
B. Calcitonin
C. Nor-epinephrine
D. Thyroxin

Q.85 **Beta cells of islets of Langerhans produce ________ hormone.** **(MDCAT 2016)**

A. Glucagon
B. Pancreatic Juice
[✓ C. Insulin]
D. Parathormone

Q.86 **The nerve impulse which jumps from node to node in myelinated neurons is called as:** **(MDCAT 2017)**

A. Resting membrane potential
B. Threshold stimulus
[✓ C. Saltatory nerve impulse]
D. Initial nerve impulse

Q.87 **Pick out the pressure receptors:** **(MDCAT 2017)**

A. Chemoreceptors
B. Photoreceptors
[✓ C. Mechanoreceptors]
D. Thermoreceptors

Q.88 **Which of the following produce response?** **(MDCAT 2017)**

[✓ A. Effectors]
B. Nerve
C. Stimulators
D. Brain

Q.89 **Taste buds on the tongue are example of:** **(MDCAT 2018)**

A. Thermoreceptors
B. Pressure receptors
C. Photoreceptors
[✓ D. Chemoreceptors]

Q.90 **When a nerve impulse jumps from one node of Ranvier to the next in a myelinated neuron, it is called ________.** **(MDCAT 2018)**

[✓ A. Saltatory conduction]
B. Resting potential
C. Synapses
D. Membrane potential

Q.91 **How many sodium ions are pumped out in response to two potassium ions transported into the membrane?** **(MDCAT 2018)**

A. 4
B. 1
C. 2
[✓ D. 3]

Q.92 **In nervous system, chemical messengers are called ________.** **(MDCAT 2018)**

A. Enzymes
B. Chemoreceptors
[✓ C. Neurotransmitters]
D. Hormones

Q.93 ________**hormone is released from posterior lobe of pituitary gland.** **(MDCAT 2018)**

A. Thyroid stimulating hormone
B. FSH
C. Adrenaline
[✓ D. Antidiuretic hormone]

Q.94 **Depolarization of neuron is characterized by:** **(ETEA 2018)**

A. Na$^+$ into the axon and K$^+$ out of the axon
B. K$^+$ into the axon and Na$^+$ out of the axon
C. Na$^+$ and K$^+$ within the axon toward the axon terminal
[✓ D. None of these]

Q.95 **The first hormone to be discovered was:** **(ETEA 2018)**

[✓ A. Secretin]
B. Testosterone
C. Insulin
D. Thyroxin

Q.96 **Pituitary gland releases ________ hormone and ________ hormone while ovaries produce ________ and progesterone.** **(NTS 2018)**

[✓ A. FSH, LH and estrogen]
B. Estrogen, FSH and LH
C. LH, estrogen and FSH
D. FSH, estrogen and LH

Q.97 The reflex action is the phenomena which only involves: **(MDCAT 2019)**

A. Brain, receptors, spinal cord
B. Receptors, neurons, brain
[✓ C. Receptors, effectors and spinal cord]
D. Receptors and effectors

Q.98 In an action potential, the permeability of sodium ions in the neuron increases due to: **(MDCAT 2019)**

A. Repolarization
B. The action of the acetylcholinesterase enzyme
[✓ C. The opening of sodium channels/gates]
D. Sodium ions forming an ionic bonding

Q.99 If stimulation is above _______, impulses travel to the brain along the sensory neuron. **(MDCAT 2019)**

A. Action Potential
B. Resting Potential
[✓ C. Threshold]
D. Recovery Period

Q.100 Acetylcholine and nor-adrenalin are two types of _______ used in our nervous system. **(MDCAT 2019)**

A. Hormones
B. Channel and carrier proteins in the cell membrane of a neuron
C. Enzymes
[✓ D. Neurotransmitters]

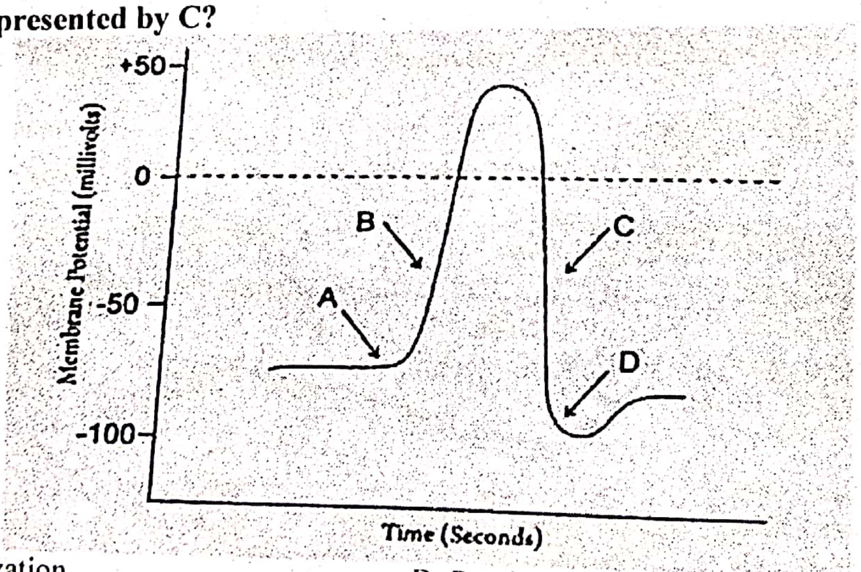
Q.101 The main neurotransmitter for synapses is ________ which lie outside the CNS. **(MDCAT 2019)**

[✓ A. Choline]
B. Acetaldehyde
C. Acetylcholine
D. Phosphatidylcholine

Q.102 Impulses jump across synapse in the form of chemical messenger such as: **(AJK 2019)**

A. Glutamine
B. Arginine
C. Leucine
[✓ D. Dopamine]

Q.103 Figure below shows different stages of action potential: **(AJK 2019)**
What is represented by C?

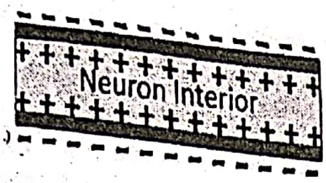


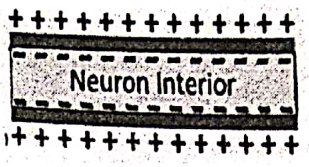
A. Depolarization
B. Resting membrane potential
[✓ C. Repolarization]
D. Hyperpolarization

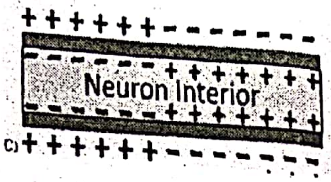
Q.104 When secretion of ADH is increased, the amount of water reabsorbed is: (AJK 2019)

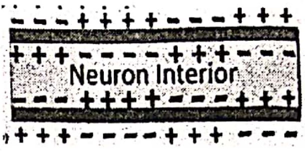
A. Increased
B. Maintained
[✓ C. Decreased]
D. Has no effect on re-absorption

Q.105 Which of the following diagram best shows the resting membrane potential? **(AJK 2019)**

A.


[✓ B.]


C.


D.


Q.106 A man has to face interview, but during his first five minutes before the interview he experiences sweating, increased heart rate and respiration. Which hormone is responsible for his restlessness? **(ETEA 2019)**

A. Adrenocorticotropic hormone
B. Insulin and glucagon
[✓ C. Epinephrine and nor-epinephrine]
D. Aldosterone

Q.107 ________ is considered as chief structural and functional unit of nervous system. **(ETEA 2019)**

A. Cell
[✓ B. Neuron]
C. Nephron
D. Brain

Q.108 Chemically hormones are: **(ETEA 2019)**

A. Carbohydrates
B. Proteins
C. Steroids
[✓ D. Both B and C]

Q.109 Excess glucose is converted in the liver to glycogen in response to the hormone: **(ETEA 2019)**

A. Glucagon
[✓ B. Insulin]
C. Bile
D. Both A and B

Q.110 In male luteinizing hormone is also known as ______. **(ETEA 2019)**

A. ACTH
[✓ B. ICSH]
C. TRF
D. MSH

Q.111 The deficiency of which micro-nutrient causes goiter formation? **(ETEA 2019)**

A. Iron
B. Zinc
[✓ C. Iodine]
D. Sodium

Q.112 Which of the following neurotransmitters function, both as neurotransmitter and hormones, decreasing our perception of pain? **(PMC 2020)**

A. Epinephrine
B. Dopamine
C. Serotonin
[✓ D. Endorphins]

Q.113 Which body function is controlled through positive feedback mechanism? **(PMC 2020)**

[✓ A. Labor contractions]
B. Insulin production
C. Body temperature
D. Thyroxin release

Q.114 Which one of the following is common to all neurons? **(PMC 2020)**

[✓ A. A cell body which contains a nucleus]
B. Presence of node of Ranvier
C. A thick myelin sheath
D. Presence of Schwann cells

Q.115 **Neurons are cells adapted for the rapid transmission of electrical impulses. To do this, they have long thin processes called:** **(PMC 2020)**

[✓ A.] Axons
B. Myelin sheath
C. Dendrites
D. Schwann cell

Q.116 **A ______ is a junction between two neurons or between a motor neuron and a muscle cell.** **(PMC 2020)**

A. Impulse
B. Axon
[✓ C.] Synapse
D. Cleft

ANSWER KEY

TOPIC-WISE MCQs & PAST PAPER

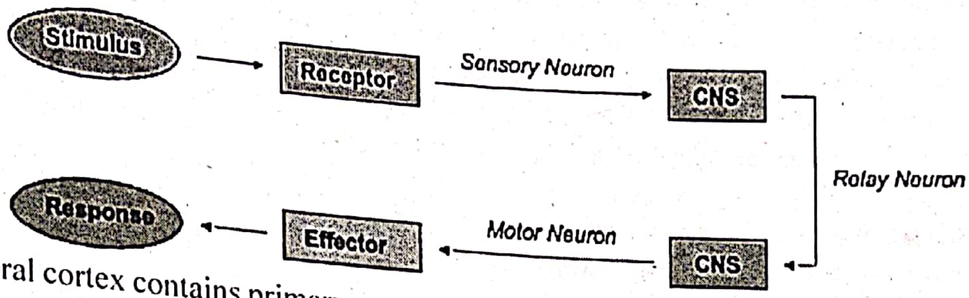
1	D	11	C	21	B	31	C	41	A	51	C	61	A	71	A	81	A	91	D	101	A	111	C
2	B	12	C	22	D	32	D	42	D	52	B	62	B	72	B	82	D	92	C	102	D	112	D
3	A	13	C	23	B	33	B	43	C	53	B	63	D	73	C	83	D	93	D	103	C	113	A
4	B	14	D	24	B	34	D	44	D	54	B	64	A	74	B	84	A	94	D	104	C	114	A
5	A	15	C	25	C	35	B	45	D	55	B	65	B	75	D	85	C	95	A	105	B	115	A
6	B	16	B	26	A	36	C	46	D	56	D	66	B	76	D	86	C	96	A	106	C	116	C
7	D	17	D	27	B	37	C	47	D	57	D	67	C	77	B	87	C	97	C	107	B		
8	A	18	B	28	A	38	D	48	A	58	B	68	B	78	C	88	A	98	C	108	D		
9	D	19	C	29	A	39	A	49	D	59	D	69	A	79	A	89	D	99	C	109	B		
10	A	20	D	30	C	40	B	50	A	60	D	70	A	80	D	90	A	100	D	110	B		

EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

1. The spinal cord extends from the occipital bone of the skull until it terminates near the second lumbar vertebra. The spinal cord is protected by three layers of meninges: the dura mater, the arachnoid mater, and the pia mater.

2.



3. Cerebral cortex contains primary sensory areas where signals originating in sensory organs such as eyes and ears are received and converted into subjective impressions, such as light and sound.

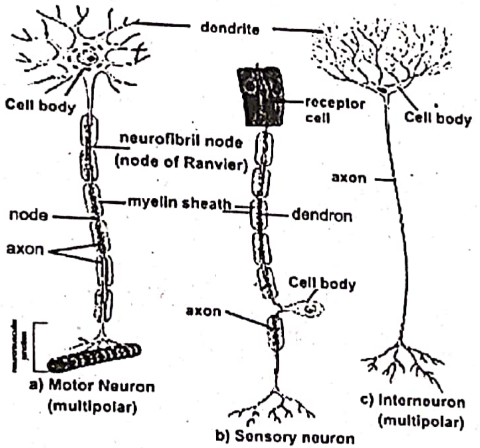
4. Ectoderm mainly gives rise to nervous system and integumentary systems while mesoderm give rise to all other tissues of the body, including heart, the muscle system, the urogenital system, bones, and bone marrow and therefore the blood.

5. These detect stimuli of touch, pressure, hearing and equilibrium (e.g. Free nerve endings + expanded tip endings + stray endings)

6. Stimuli are always detected by specific receptors present in different parts of the body. Stimulus of touch, pain, cold and heat are recognized differently because these stimuli are detected by different receptors present in different parts of the body.

7. Some cells are attached with the neurons, along the length of axon that are specialized for the production of myelin sheath; these are type of neuroglia cells in PNS named as Schwann cells.

8.



a) Motor Neuron (multipolar)

b) Sensory neuron (unipolar)

c) Interneuron (multipolar)

9. Efferent neurons are meant to conduct messages from CNS to the effectors as they are emerging from CNS that's why they are known as motor neurons.

10. Number of neurons present in body varies, brain contains the highest number and spinal cord comes on second number.

11. Myelin is a fatty substance that surrounds the axon of nerve cells, forming an electrically insulating layer. It facilitates the saltatory conduction of impulses but since, it is lipid in nature, it itself does not conduct impulses.

12. Myelin sheath is a mixture of proteins and lipids, and not present in all types of axons and dendron, and it is meant to increase the speed of conduction

13. Efferent neuron is another name used for motor neurons which are meant for the conduction of messages from CNS to the effectors

14. Extensions of neuron have the ability to regenerate only when if its cell body is intact because the nucleus of the neurons is present in it but cell body is devoid of that property.

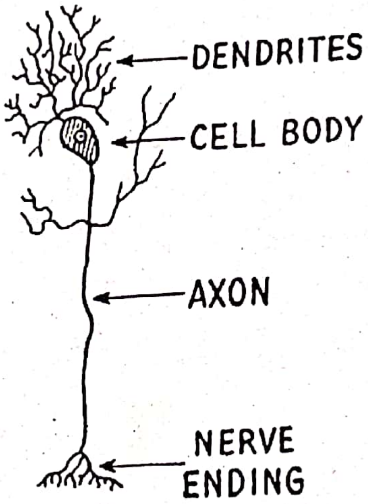
15. Grey matter is mainly composed of cell bodies of neurons while white matter is composed of myelin sheath.

16. Cell body of a neuron is main nutritional part. It is the part where biosynthesis of required materials is taking place. It also provides the genetic information for the regeneration of neuronal processes. Axoplasm is the cytoplasm of nerve axon.

17. Mitochondria, ribosomes and secretary vesicles are found in synaptic knob while nucleus is present in the cell body of neuron.

18. Associated neurons, also called inter-neurons or relay neurons are neurons that are found exclusively in the central nervous system. It means that they are found in the brain and spinal cord and not in the peripheral segments of the nervous system.

19.

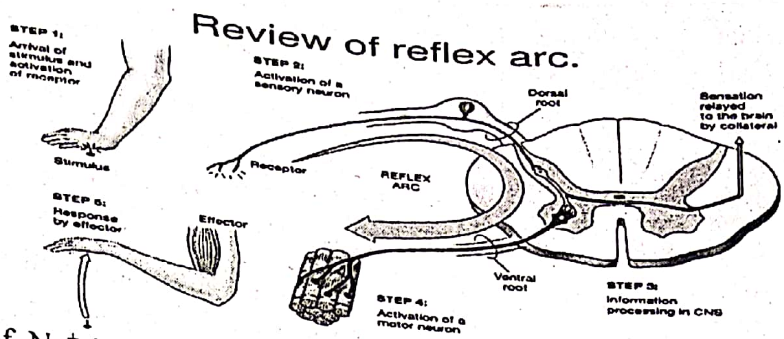


20. Axon, Nissl's granules and dendron are the parts of a neuron while synapse is a structure that permits a neuron to pass an electrical or chemical signal to another neuron or to the target effector cell/tissue.

21. The simplest arrangement of a reflex arc consists of the receptor, an interneuron, and an effector; together these units form a functional reflex group. Brain is, however, excluded in the reflex arc.

22. The spinal cord functions primarily in the transmission of nerve signals from the motor cortex to the body, and from the afferent fibers of the sensory neurons to the sensory cortex. It is also a center The simplest arrangement of a reflex arc consists of the receptor, an interneuron, and an effector; together these units form a functional reflex group. Brain is, however, excluded in the reflex arc. For coordinating many reflexes and contains reflex arcs that can independently control reflexes.

23.


Review of reflex arc.
STEP 1: Arrival of stimulus and activation of receptor
Stimulus
STEP 2: Activation of a sensory neuron
Receptor
REFLEX ARC
Dorsal root
Sensation relayed to the brain by collateral
STEP 5: Response by effector
Effector
STEP 4: Activation of a motor neuron
Ventral root
STEP 3: Information processing in CNS

24. The influx of Na^+ increases the concentration of positively charged ions in the cell and causes depolarization, where the potential of the cell is higher than the cell's resting potential. The sodium channels close at the peak of the action potential, while potassium continues to leave the cell.

25. Hyperpolarization is a change in a cell's membrane potential that makes it more negative. It is the opposite to that of a depolarization. It is mainly caused by late closing of K^+ channels.

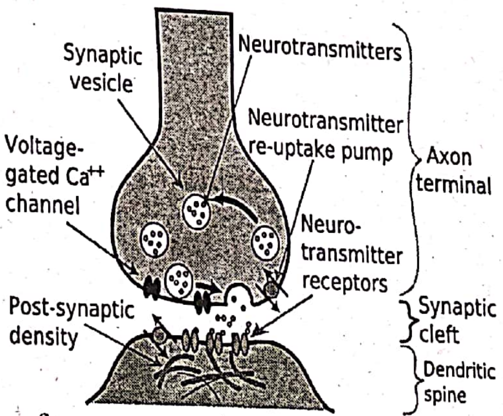
26. Sodium and potassium plays key role in the conduction of nerve impulse by their respective movement across the membrane.

27. In neuro-lemma, a specialized ATP dependent Na^+-K^+ pump is present which will restore original ion gradient and hence the resting membrane potential.

28. In the nervous system, a synapse is a structure that permits a neuron to pass an electrical or chemical signal to another neuron or to the target effector cell. Synaptic cleft is the space between neurons at a nerve synapse across which a nerve impulse is transmitted by a neurotransmitter.

29. When the action potential reaches the nerve terminal, voltage dependent Ca^{2+} channels will open and Ca^{2+} rushes into the neuron terminal due to a greater extracellular concentration, causing release of neurotransmitter molecules from pre-synaptic membrane into synaptic cleft.

30.



31. After the depolarization of post synaptic neuro-lemma, neurotransmitters are mostly degraded by the enzymes or taken up actively by pre-synaptic neuro-lemma. For example, acetylcholinestrase is an enzyme that degrades acetylcholine after synaptic transmission.

32. Epinephrine or adrenaline produced both by adrenal gland as well as by brain and it will act both as a hormone and neurotransmitter.

33. Hormones are the organic secretion produced by the endocrine glands which are transported to the target tissue via blood stream and they cannot initiate a chemical reaction, but they can only regulate.

34. Mammalian testes produce testosterone which is steroid in nature. Pancreas produces insulin and glucagon which are protein hormones. Hypothalamus produces neurosecretions which are polypeptide in nature.

35. Cholesterol is the precursor of the five major classes of steroid hormones: progestogens, glucocorticoids, mineralocorticoids, androgens, and estrogens. These hormones are powerful signaling molecules that regulate many functions.

36. Endocrine glands are ductless glands and release their secretions into blood. They reach the target site through bloodstream.

37. ADH is responsible for reabsorption of H_2O from collecting tubules and lack of ADH results in production of large quantities of urine and increased thirst.

38. Adrenocorticotropic hormone is a polypeptide tropic hormone produced and secreted by the anterior pituitary gland.

39. Neurosecretory cells in the hypothalamus release oxytocin and ADH into the posterior lobe of the pituitary gland. These hormones are stored or released into the blood

40. The term hypophysis (from the Greek for “lying under”)-another name for the pituitary-refers to the gland's position on the underside of the brain.

41. The anterior pituitary gland is often dubbed the “master gland” because its hormones control other parts of the endocrine system, namely the thyroid gland, adrenal glands, ovaries, and testes.

42. More the Thyrotrophin releasing factor from hypothalamus more will be Thyroid Stimulating Hormone (TSH). TSH is released under stress condition; its level is high during growth and development.

43. Prolactin-inhibiting hormone (PIH) inhibits the secretions of prolactin hormone from anterior lobe of pituitary gland.

44. Diabetes insipidus is due to low level of ADH.

45. The hormones released from anterior lobe of pituitary glands are called tropic hormones as the control the secretions from other glands in the body

46. In Cushing's disease too much cortical hormone is produced. MSH is produced from Median lobe of pituitary gland and it is produced under sun light, its level is increased during pregnancy and in Addison's disease.

47. T_4 is main thyroid hormone, also called as thyroxin, it is tetraiodo-thyronin. T_3 is produces in small quantity and is unstable and is degraded during its travelling.

48. Calcitonin acts to reduce blood Ca^{2+}, opposing the effects of parathyroid hormone, by deposition of Ca^{2+} in the bones.

49. Low level of thyroxin stimulates hypothalamus to release thyrotrophin releasing factor which stimulates the production of thyroid stimulating hormone from anterior lobe of pituitary gland. TSH acts on thyroid gland which starts producing thyroxin. If the level of thyroxin is already high, then the TSH will not be produced.

50. Cretinism is a condition of severely stunted physical and mental growth owing to untreated congenital deficiency of thyroid hormone (congenital hypothyroidism) usually owing to maternal hypothyroidism.

51. Frog metamorphosis is regulated by thyroid hormones (THs), promoting the remodeling of the aquatic larvae into an adult tetrapod, means that the dramatic structural and functional changes of larval tissues can be readily applied as parameters reflecting endocrine disruption.

52. Grave's disease is an autoimmune disease that affects the thyroid. It frequently results in increased BMR. It also often results in an enlarged thyroid.

53. Under activity causes a drop in blood calcium ions which in turn leads to muscular tetany.

54. Parathormone is secreted when the calcium level of blood is low while calcitonin is secreted at high level of calcium ions in the blood. So, both the hormones are antagonistic to each other in terms of controlling level of calcium in the blood.

55. The pancreas is divided into an exocrine portion and an endocrine portion (islets of Langerhans). The exocrine portion, comprising 85% of the mass of the pancreas, and secretes pancreatic juice into the duodenum while about 15% of the mass of pancreas is the endocrine portion which secrete various hormones into the bloodstream.

56. Insulin is responsible to decrease glucose by the conversion of glucose into glycogen. It is also responsible for increase glucose uptake by the cell and converts glucose into lipids and proteins.

57. Glucagon strongly opposes the action of insulin; it raises the concentration of glucose in the blood by promoting breakdown of glycogen by stimulating production of glucose from lipids.

58. Pancreatic islets house two major cell types, each of which produces a different endocrine product: Alpha cells secrete the hormone glucagon. Beta cells produce insulin and are the most abundant of the islet cells.

59. Release of hormones from islets of Langerhans is under control of the pituitary trophic hormones, STH and ACTH and also responds directly to the level of blood glucose.

60. Beta cells have no relation with calcium regulation.

61. Cortisol bring about the increase in blood glucose. It is principal glucocorticoid.

62. Cortisol bring about the increase in blood glucose. Corticosterone is responsible for the increase of mineral and glucose level in blood. Aldosterone is principal mineralocorticoid, brings about increase in mineral level in blood mainly Na^+.

63. Tay-Sach's is due to abnormality in lysosomal non-functioning.

64. Tumor in adrenal cortex leads to the excessive secretions of androgen hormone which results in the development of secondary sex characters in female and also results in high steroid level in the blood. It has no role for sterility of an individual.

65. Adrenaline dilates the blood vessels in certain parts of the body such as skeletal muscles. But nor-adrenaline constricts blood vessels again in certain parts of the body such as gut, so the effect of the two hormone is synergistic in raising blood pressure.

66. Destruction of the adrenal cortex such as, occurs in Addison's disease, will lead to general metabolic disturbance, in particular weakness of muscle action and loss of salts.

67. These hormones provide glucose to handle stress.

68. Follicle-stimulating hormone (FSH) is secreted by the anterior pituitary in response to gonadotropin-releasing hormone (GnRH) released by the hypothalamus. In women, LH stimulates estrogen production from the ovary.

69. At puberty testosterone helps in the development of secondary sex characteristics in males. When testes are surgically removed then the level of testosterone is lower and leads to sterile male.

70. In fetus the testosterone hormone initiates the development of primary sex organs but at puberty its secretion helps in the development of secondary sex characters.

71. Estrogen is produced from developing follicles under the action of FSH. Ruptured follicles are responsible for progesterone production

72. After puberty the supply of LH (ICSH) is constant and therefore the level of testosterone remains constant.

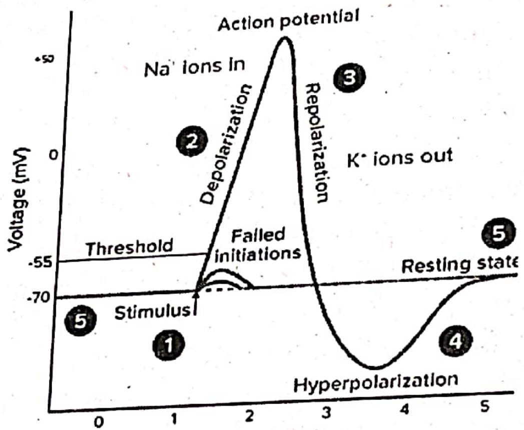
73. Positive feedback system, the output enhances the original stimulus. A good example of a positive feedback system is child birth. During labor, a hormone called oxytocin is released that intensifies and speeds up contractions.

74. Most hormones are regulated by feedback mechanisms. A feedback mechanism is a loop in which a product feeds back to control its own production. Most hormone feedback mechanisms involve negative feedback loops. Negative feedback keeps the concentration of a hormone within a narrow range.

75.

Chemical Nature of Hormones	Glands	Examples
Protein	Islets of Langerhans	Insulin, Glucagon
Polypeptides	Posterior pituitary	ADH, Oxytocin
Amino Acids and Derivatives	Thyroid, Adrenal Medulla	T3, T4, Epinephrine, Nor-epinephrine
Steroid	Gonads, Adrenal Cortex	Estrogen, Testosterone, Cortisone.

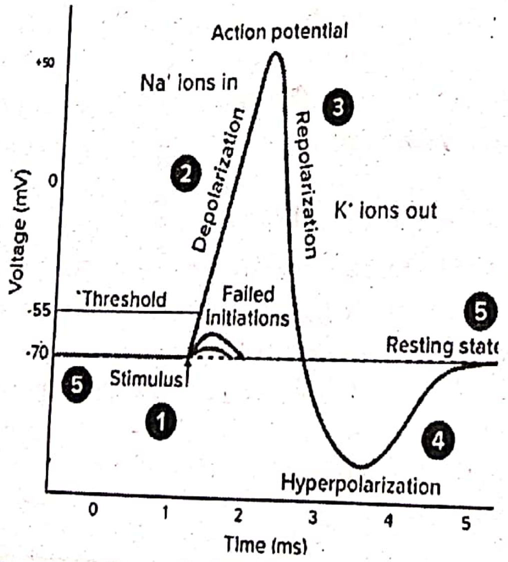
76.



77. Epinephrine and norepinephrine are the hormones of adrenal medulla during emergency conditions.

78. Due to destruction of Beta-cells of pancreas activity of alpha-cells will increase, due to which glucose level in blood will increase.

79.



80. Acetylcholine is neurotransmitter for synapse outside CNS while adrenalin, nor-epinephrine, serotonin and dopamine in CNS.

81. Pancreatic islets house two major cell types, each of which produces a different endocrine product: Alpha cells secrete the hormone glucagon. Beta cells produce insulin and are the most abundant of the islet cells.

82. Calcium ($Ca2+$) is a vital element in the process of neurotransmitter release; when Ca2+ channels are blocked, neurotransmitter release is inhibited. When the action potential reaches the nerve terminal, voltage-dependent Ca2+ channels open and Ca2+ rushes into the neuron terminal due to a greater extracellular concentration. Glucagon is a hormone secreted from endocrine cells of pancreas.

83. Thyroxin and Calcitonin are released by thyroid gland while glucagon is released by pancreas.

84. Glucagon is essentially antagonistic to insulin and causes an increase in blood glucose levels. It does this mainly by:

- Promoting breakdown of glycogen to glucose in the liver and muscles.
- Increasing the rate of breakdown of fats.

85. Pancreatic islets house two major cell types, each of which produces a different endocrine product: Alpha cells secrete the hormone glucagon. Beta cells produce insulin and are the most abundant of the islet cells.

86. The nerve impulse is conducted from node to node in jumping manner. This kind of jumping nerve impulse is called saltatory impulse.

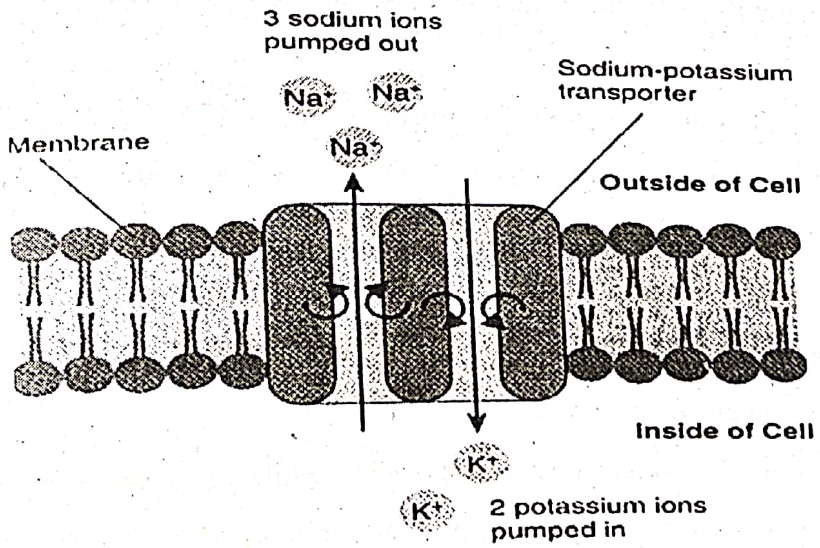
87. Mechanoreceptors are receptors in the skin and on other organs that detect sensations of touch. They are called mechanoreceptors because they are designed to detect mechanical sensations or differences in pressure.

88. Effector a structure or organ that brings about an action of effect' as a result of a stimulus received through a receptor which can come from the CNS or from a hormone.

89. The taste receptors are located around the small structures known as papillae found on the upper surface of the tongue, these are chemoreceptors.

90. The nerve impulse is conducted from node to node in jumping manner. This kind of jumping nerve impulse is called saltatory impulse.

91.



92. Neurotransmitters are endogenous chemicals acting as signaling molecules that enable the transmission of nerve impulse.

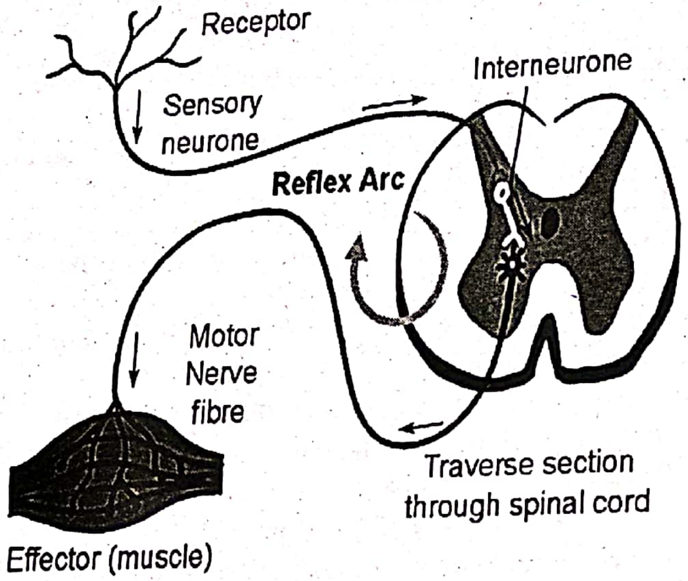
93. ADH and oxytocin are secreted by neuromuscular cells of hypothalamus. They are temporarily stored in nerve endings in posterior lobe of pituitary gland. Then they are released from posterior lobe of pituitary into blood.

94. Due to opening of sodium gates, sodium ions move inward the neuron to cause depolarization.

95. Secretin is a first hormone to be discovered, produce from duodenal lining due to stimulus of acidic chyme.

96. FSH and LH collectively called gonadotrophic hormones, released from anterior lobe of pituitary and acts on gonads for further secretions.

97.



98. The passage of nerve impulse is associated with increase in permeability of Na^+ due to the opening of Na^+ channels, moving inwards upsetting the potential momentarily, making the inside more positive than outside.

99. Minimum intensity of stimulus that is required to initiate a nerve impulse is called threshold stimulus.

100. Neurotransmitters are endogenous chemicals acting as signaling molecules that enable the transmission of nerve impulse. Acetylcholine is neurotransmitter for synapse outside CNS while adrenalin, nor-epinephrine, serotonin and dopamine in CNS.

101. Acetylcholine is an organic chemical that functions in the brain as a neurotransmitter i.e. a chemical message released by nerve cells to send signals to other cells, such as neurons, muscle cells and gland cells.

102. Glutamine, arginine and leucine are amino acids, while dopamine is a neurotransmitter.

103. Due to influx of sodium ions depolarization occur, while due to outflux of potassium ions repolarization occur.

104. During low blood osmotic concentration ADH secretion will increase and act on distilled part of nephron to increase water reabsorption.

105. During resting membrane potential membrane will be highly positive from outside and highly negative from inside.

106. Hormones of adrenal medulla are called as emergency hormones. Both will increase blood pressure during an emergency case.

107. Neurons are structural and functional unit of nervous system, nephrons are structural and functional unit of kidney.

108. No hormone has carbohydrates nature. With respect to chemical nature all hormones are protein in nature except few which are steroid in nature.

109. Insulin and glucagon ae antagonistic hormones.

110. Luteinizing hormone cause ovulation in human female. In male it will be named as ICSH and stimulate interstitial cells of testis for testosterone production.

111. Iodine involves in formation of thyroxin. Deficiency of iodine means deficiency of thyroxin.

112. The endorphins are peptides that function as both neurotransmitters and hormones, decreasing our perception of pain

113. Stretch-receptive neurons in the cervix respond to this extension by signaling the hypothalamus, which response by triggering the release of oxytocin that stimulates more and stronger uttering contractions.

114. The cell body or soma is the main nutritional part of the cell and is concerned with the biosynthesis of materials necessary for the growth and maintenance of the neuron.

115. Axons are the protoplasmic part of the cell body of neuron and are responsible for carrying the impulses away from the cell body.

116. Consecutive neurons are so arranged that the axon endings of one neuron are connected to the dendrites of the next neuron. There is no cytoplasmic connection between the two neurons and microscopic gaps are left between them. Each of these contact points is known as synapse.

6 TOPIC DIVERSITY AMONG ANIMALS

PRACTICE EXERCISE

TOPIC-WISE MCQs

Q.1 Animals of grade radiata are:
[✓ A. Diploblastic]
B. Acoelomate
C. Triploblastic
D. Pseudocoelomate

Q.2 All are the features of kingdom animalia except:
A. Heterotroph
[✓ B. Organic synthesis]
C. Eukaryotes
D. Multicellular

Q.3 Reproductive system arises from:
A. Germ layer
B. Ectoderm
[✓ C. Mesoderm]
D. Endoderm

Q.4 Pseudocoelom develops from:
A. Blastostyl
[✓ B. Blastocoel]
C. Blastocyst
D. Mesoderm

Q.5 Reproductive system, excretory system, circulatory system and respiratory system developed from:
A. Ectoderm
B. Endoderm
[✓ C. Mesoderm]
D. Ectoderm and endoderm

Q.6 Bilaterally symmetrical animals are:
A. Lesser developed
B. Lacking mesoderm
C. Placed in one phylum only
[✓ D. Triploblastic]

Q.7 The animal which has false coelom is:
A. Spongilla
B. *Obelia*
C. Hookworm
[✓ D. Planaria]

Q.8 In coelomate the layer that surround endoderm is:
A. Coelomic Epithelium
B. Ectoderm
[✓ C. Visceral Mesoderm]
D. Parietal Mesoderm

Q.9 All are correct about acoelomates except:
A. Sac type digestive system
[✓ B. Well-developed respiratory system]
C. Parenchyma fill the body space
D. Well-developed Excretory system

Q.10 An acoelomate is:
[✓ A. Flatworm]
B. Molluscs
C. Annelids
D. Earthworm

Q.11 A body cavity is absent in:
[✓ A. Acoelomates]
B. Pseudocoelomates
C. Acoelomates and Pseudocoelomates
D. Coelomates

Q.12 A fluid filled cavity which is mesodermal in origin but absent in nematodes is:
[✓ A. Coelom]
B. Gastrocoel
C. Pseudocoelom
D. Spongocoel

Q.13 Everything is true about coelom except:
A. Found between body wall and gut
B. Fluid filled
C. Lined by mesoderm
[✓ D. Bound internally by cuticle of intestine]

Q.14 Acoelomates do not lack:
A. Coelom
[✓ B. Mesoderm]
C. Special transport system
D. Coelomic fluid

Q.15 In coelomates, gut is lined externally by:
[✓ A. Visceral mesoderm]
B. Parietal mesoderm
C. Splanchnic mesoderm
D. Endoderm

Q.16 Which system is more developed in acoelomates?
[✓ A. Excretory system]
B. Respiratory system
C. Digestive system
D. Osmoregulatory system

Q.17 Spiral and determinate type cleavage is present in:
[✓ A. Pinworm]
B. Star fish
C. Cake urchin
D. Amphioxus

Q.18 Indeterminate cleavage is not a characteristic of:
A. Echinodermata
[✓ B. Mollusca]
C. Chordata
D. Hemichordata

Q.19 Sponges have special mobile cells called:
A. Pinacocytes
B. Flagellated cells
C. Choanocytes
[✓ D. Amoebocytes]

Q.20 An animal found from ocean was observed to have no tissue organization is most likely to be the member of phylum.
[✓ A. Porifera]
B. Coelenterate
C. Echinodermata
D. Hemichordate

Q.21 The skeleton of sponges consists of:
A. Carbonate of lime
B. Silicon
C. Calcium carbonate
[✓ D. Carbonate of lime & silicon]

Q.22 Body of porifera is tubular which is opened at its anterior end called:
A. Culum
[✓ B. Osculum]
C. Spongocoel
D. Ostia

Q.23 All are the uses of sponges except:
A. Washing and bathing
[✓ B. Reduce air pollution]
C. In surgical operations
D. To absorb sound waves

Q.24 Animals of grade________ can be divided into equal halves in many planes.
A. Multigenecity
B. Polymorphism
[✓ C. Radiata]
D. Bilateria

Q.25 ________ cells of cnidarians give rise to nematocyst.
[✓ A. Ectodermal]
B. Endodermal
C. Mesodermal
D. Peridermal

Q.26 Asexual reproduction is more common in cnidarians. It is performed by:
A. Budding
B. Regeneration
C. Rarely by fragmentation.
[✓ D. All of these]

Q.27 The existence of a single species in more than two morphological forms (individual types) is termed as:
A. Mutagenesis
B. Metagenisis
[✓ C. Polymorphism]
D. Unicellular organism

Q.28 ___________ develops gonads in which egg or sperms are formed:
A. Polyps
[✓ B. Medusae]
C. Gastrozoids
D. Blastostyle

Q.29 It is not the importance of coral reef:
A. Provide ecosystem to marine life
B. Used as ornaments
C. Provide breeding habitat for fishes
[✓ D. Used as sound absorber]

Q.30 The animals in grade bilateria and triploblastic are all except:
A. Platyhelminthes, nematode
B. Annelida, mollusca
C. Arthropoda, and chordate
[✓ D. Cnidaria]

Q.31 Gastrovascular cavity of coelenterates perform following function:
A. Digestion
B. Respiration
C. Excretion
[✓ D. All of these]

Q.32 The nematocysts are the organs of defense in ________.
[✓ A. Coelenterata]
B. Echinodermata
C. Annelida
D. Tracheophytes

Q.33 It is not true for Phylum Platyhelminthes:
A. Bilaterally symmetrical
B. Triploblastic metazoan
C. Dorsoventrally compressed body
[✓ D. Radially symmetrical body]

Q.34 The body of Aschelminthes is covered by a hard layer of:
A. Chitin
[✓ B. Cuticle]
C. Cilia
D. Spongin

Q.35 ________ is a human parasite commonly known as pinworm.
A. *Fasciola hepatica*
B. *Taenia solium*
[✓ C. *Enterobius vermicularis*]
D. *Aurelia aurita*

Q.36 The nervous system in Aschelminthes consists of a nerve ring which encircles the:
A. Mouth
[✓ B. Pharynx]
C. Larynx
D. Anus

Q.37 Molluscs are soft bodied, triploblastic animals, most of them are protected by a shell of calcium carbonate secreted by:
[✓ A. Mantle]
B. Ectoderm
C. Mesoderm
D. Ectoderm

Q.38 The internal opening of nephridia is called:
A. Nephridiopore
[✓ B. Nephrostome]
C. Metanephridia
D. Nephropore

Q.39 Locomotory organs are ________ in earthworm and ________ in *neries* respectively.
[✓ A. Setae, parapodia]
B. Parapodia, setae
C. Setae
D. Setae, chaetae

Q.40 The most successful group and the largest phylum of the animals:
A. Phylum Mollusca
B. Phylum Porifera
C. Phylum Annelida
[✓ D. Phylum Arthropoda]

Q.41 Natural silk is not:
A. A protein
B. Produced by modified salivary glands
C. Obtained from an insect
[✓ D. Glycolipid in nature]

Q.42 Scavenger insects may eat:
A. Dead matter present on organism
[✓ B. Dead animals and plants]
C. Dead plant matter only
D. Living animals only

Q.43 Fate of the blastomeres is foretold in:
A. Echinoderms
B. Hemichordates
[✓ C. Arthropods]
D. Chordates

Q.44 Reptiles flourished throughout ________ era.
A. *Cenozoic*
B. *Devonian*
C. *Proterozoic*
[✓ D. *Mesozoic*]

Q.45 Birds do not have teeth so the function of teeth is performed by:
A. Beak
B. Pharynx
C. Stomach
[✓ D. Gizzard]

Q.46 Which of them is not poikilotherm?
[✓ A. Spiny ant eater]
B. Lizard
C. Crocodile
D. Snake

Q.47 The lower jaw is composed of only one large bone:
A. Reptiles
B. Amphibian
C. Chondrichthyes
[✓ D. Mammals]

PAST PAPER QUESTIONS

Q.48 Which one of the following is the primary host of liver fluke? **(MDCAT-2014)**
A. Man
B. Snail
[✓ C. Sheep]
D. Dog

Q.49 Which one of the following is an example of a free living carnivorous flatworm? **(MDCAT-2014)**
A. Liver fluke
B. Tapeworm
[✓ C. *Dugesia*]
D. *Schistosoma*

Q.50 Ascaris is which one of the following? **(MDCAT-2014)**
A. Ectoparasite
B. Respiratory tract parasite
[✓ C. Intestinal parasite]
D. Urinogenital tract parasite

Q.51 Polymorphism is a feature exhibited by members of: **(MDCAT-2014)**
[✓ **A. Coelenterates**]
B. Porifera
C. Arthropoda
D. Platyhelminthes

Q.52 ________ is a triploblastic organism. **(MDCAT-2015)**
A. Jelly Fish
[✓ B. Tapeworm]
C. Sea Anemone
D. Corals

Q.53 In arthropods, the body cavity is in the form of: **(MDCAT-2015)**
A. Coelom
B. Pseudocoelom
[✓ **C. Haemocoel**]
D. Enteron

Q.54 ________ is also called liver fluke. **(MDCAT-2015)**
A. *Dugesia*
[✓ B. *Fasciola*]
C. *Taenia*
D. Coral

Q.55 Name common gut roundworm parasite of human and pigs. **(MDCAT-2015)**
[✓ A. *Ascarislumberocoides*]
B. *Pheretimaposthuma*
C. *Lumbericusterresaris*
D. *HirudoMedicinalis*

Q.56 ________ is a good example of polymorphism. **(MDCAT-2015)**
A. *Hydra*
[✓ B. *Obelia*]
C. Starfish
D. *Euplectella*

Q.57 In radial symmetry all body parts are arranged around the central axis. Radial symmetry represents ________ mode of life. **(MDCAT-2016)**
[✓ A. Sessile]
B. Active
C. Streamlined
D. Parasitic

Q.58 **Pseudo-coelomates have a body cavity but it is not true coelom. Which one of the following is included in the group?** **(MDCAT-2016)**
A. Planaria
B. Earthworm
C. Tapeworm
[✓ D. Ascaris]

Q.59 ***Taenia*** **is an endoparasite of human, pig and cattle which belongs to phylum.** **(MDCAT-2016)**
A. Cnidaria
B. Annelida
C. Aschelminthes
[✓ D. Platyhelminthes]

Q.60 **Body of ________ consists of segments called proglottids which contains mainly sex organs.** **(MDCAT-2016)**
A. Planaria
B. *Fasciola*
C. Ascaris
[✓ D. Tapeworm]

Q.61 **_________ is a common parasite of the intestine of human and pig which belongs to phylum nematode.** **(MDCAT-2016)**
A. *Taeniasolanum*
[✓ B. *Ascarislumbriocoides*]
C. *Schistosoma*
D. *Fasciola hepatica*

Q.62 **Snails are the intermediate hosts in:** **(MDCAT-2017)**
[✓ A. *Fasciola hepatica*]
B. *Schistoma*
C. *Taeniasolium*
D. *Ancyclosomaduodenale*

Q.63 **___________is an intestinal parasite of man belonging to phylum nematoda.** **(MDCAT-2017)**
A.*Taenia solium*
[✓ B. *Ascaria lumbricoides*]
C.*Wucheroni abancrolti*
D.*Schistoma*

Q.64 **Following group is the example of acoelomates:** **(MDCAT-2018)**
[✓ A. Platyhelminthes]
B. Aschelminthes
C. Molluscs
D. Annelids

Q.65 **Opossum and koala bear belongs to sub-class:** **(ETEA-2019)**
A. Prototheria
B. Eutheria
[✓ C. Metatheria]
D. Monotremata

Q.66 **The larva formed during the life cycle of Annelida is:** **(ETEA-2019)**
A. Glochidium larva
B. Bipinnaria larva .
[✓ C. Trochophore larva]
D. Tornaria larva

Q.67 **Platyhelminthes are:** **(ETEA-2019)**
A. Bilaterally symmetrical and diploblastic
[✓ B. Bilaterally symmetrical and triploblastic]
C. Radially symmetrical and triploblastic
D. Radially symmetrically and diploblastic

Q.68 ***Pheretima posthuma*** **is the scientific name of:** **(LUMHS-2015)**
A. Planaria
B. Liver fluke
[✓ C. Earth worm]
D. Tape worm
E. Ascaris

Q.69 **Which group of organisms has the following features?** **(NTS-2017)**
1. Three pairs of jointed legs
2. Three-part segmented body
3. One pair of antennae
A. Arachnoids
B. Crustaceans
[✓ C. Insects]
D. Myriapods

Q.70 The table shows some characteristics of four different vertebrates. Which vertebrate is a reptile? (NTS-2017)

	Fins	Legs	Scales	Hair
A	✓	×	✓	×
B	×	✓	✓	×
C	×	✓	×	×
D	×	✓	×	✓

Q.71 Platyhelminthes means: (NTS-2017)

A. Flat worms
B. Round worms
C. Segmented worms
D. None

ANSWER KEY

TOPIC-WISE MCQs & PAST PAPER MCQs

1	A	16	A	31	D	46	A	61	B
2	B	17	A	32	A	47	D	62	A
3	C	18	B	33	D	48	C	63	B
4	B	19	D	34	B	49	C	64	A
5	C	20	A	35	C	50	C	65	C
6	D	21	D	36	B	51	A	66	C
7	D	22	B	37	A	52	B	67	B
8	C	23	B	38	B	53	C	68	C
9	B	24	C	39	A	54	B	69	C
10	A	25	A	40	D	55	A	70	B
11	A	26	D	41	D	56	B	71	A
12	A	27	C	42	B	57	A		
13	D	28	B	43	C	58	D		
14	B	29	D	44	D	59	D		
15	A	30	D	45	D	60	D		

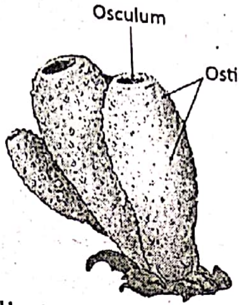
EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

1. Grade radiate includes only one phylum Cnidaria. These animals are always diploblastic and have gastrovascular cavity with sac type digestive system.
2. Organic synthesis is referred to as photosynthesis in which inorganic molecules (water and carbon dioxide) are converted into organic molecule (Glucose). This process takes place in Autotrophs.
3. Ectoderm form skin and nervous system, Endoderm form digestive system and rest of the systems in triploblastic animals are formed from mesoderm including reproductive system.
4. The body cavity that is formed from Blastocoel (cavity that is formed at blastula stage of developing embryo) is called pseudocoelom.
5. Ectoderm forms skin and nervous system. Endoderm forms lining of digestive system and rest of the systems in triploblastic animals originate from mesoderm.
6. All bilateral symmetrical animals are triploblastic.
7. False coelom is characteristic of Aschelminthes (nematodes). Hook worm belongs to this phylum.
8. Coelom (body cavity) is formed due to splitting of mesoderm at embryonic stages. Its outer layer is called parietal layer which underlines the body wall, while inner layer of mesoderm is called visceral layer that surrounds the endoderm.
9. Acoelomate includes animals of Phylum Platyhelminthes in which re7spiratory and circulatory system is absent. Gaseous exchange takes place directly through body surface.
10. All the Platyhelminthes (flatworm) are acoelomates.
11. Acoelomates are those animals in which there is no body cavity or space between body wall and digestive system. This group includes only one phylum Platyhelminthes.
12. Coelom is true body cavity which is always formed from mesoderm. Nematodes are Pseudocoelomates.
13. Coelom is internally lined by visceral layer of mesoderm. In pseudocoelomates body cavity is internally bound by cuticle of intestine.
14. Acoelomates are triploblastic animals in which all the three germinal layers ectoderm, mesoderm and endoderm are present.
15. During embryonic development mesoderm splits into outer parietal layer that internally lines the body wall and inner visceral layer (mesoderm) that externally surrounds gut.
16. Acoelomate has sac type digestive system, no respiratory and osmoregulatory systems. They have tubular excretory system called protonephridia having flame cells.
17. Spiral and determinate type cleavage is present in proterostomes. Pinworm belongs to phylum Aschelminthes that are proterostomes.
18. Molluscs are proterosromes and have determinate cleavage in which fate of blastomeres is foretold. Indeterminate cleavage is characteristic of deuterostomes.
19. Amoebocytes are amoeba like cells found in sponges. They are totipotent (able to divide and form differentiate cells) in nature. They basically store, digest and transport food, excrete wastes, secrete skeleton and also may give rise to buds in asexual reproduction.
20. Unlike Protozoans, the Poriferans are multicellular. However, unlike higher metazoans, the cells that make up a sponge are not organized into tissues. Therefore, sponges lack true tissues and organs; in addition, they have no body symmetry.

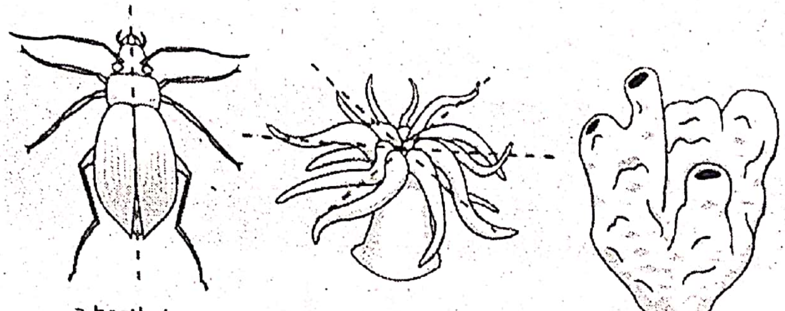
21. A sponge endoskeleton consists of short, sharp rods called spicules. Spicules are made of silica, calcium carbonate, or spongin, a tough protein.

22.



23. Lichens can be used as air pollution indicators, especially of the concentration of sulphur dioxide in the atmosphere. Air pollutants dissolved in rainwater, especially sulphur dioxide, can damage lichens and prevent them from growing. This makes lichens natural indicators of air pollution.

24.



a beetle has bilateral symmetry

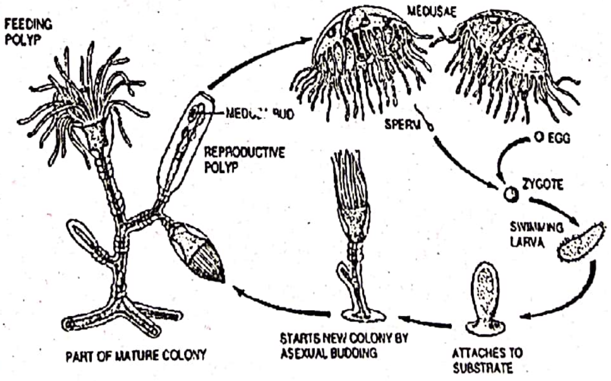
a coral polyp has radial symmetry

a sponge has no symmetry

25. Cnidarians are essentially bags made of two cell layers. The outer ectoderm, or epidermis, contains the cnidocytes, the stinging cells that are characteristic of the phylum. In between epidermis and gastrodermis is the mesoglea, a layer of jellylike substance which contains scattered cells and collagen fibers.

26. Due to simple organization the members of the genus Hydra reproduce by budding, fragmentation or Regeneration.

27.



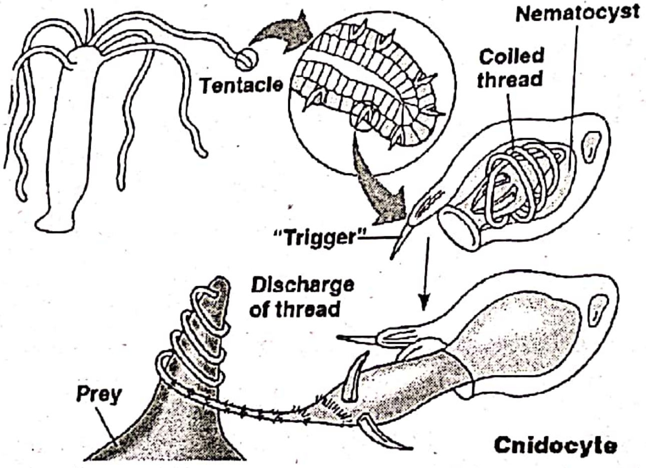
28. Medusa is a mobile life cycle stage of the Cnidaria phylum, contracting with it muscular bel. Polyp has a tubular shape and are fixed at their base, with the mouth present at the other end of the tube facing the water.

29. Sound travels as a wave that can either absorb into a surface or reflect off it. For example, a sponge will absorb sound and muffle vibrations

30. **General characteristics of Phylum coelenterata**
Kingdom: Animalia.
Habitat: aquatic, mostly marine.
Habit: solitary or colonial
Symmetry: radially symmetrical
Grade of organization: tissue grade of organization.
Germ layer: diploblastic, outer ectoderm and inner endoderm.

31. Functions of Gastrovascular cavity in coelenterates are;
    - **i.** Digestion & distribution of nutrients throughout the body
    - **ii.** Gases exchange
    - **iii.** Remove of waste
    - **iv.** Serve as a hydrostatic skeleton.

32.



33. Phylum Platyhelminthes have bilateral symmetry. This means there is only one plane of symmetry.

34. Intestinal parasites, generally do not absorb nutrients through the body surface as there is usually a thick cuticle to protect themselves from the host's digestive liquids

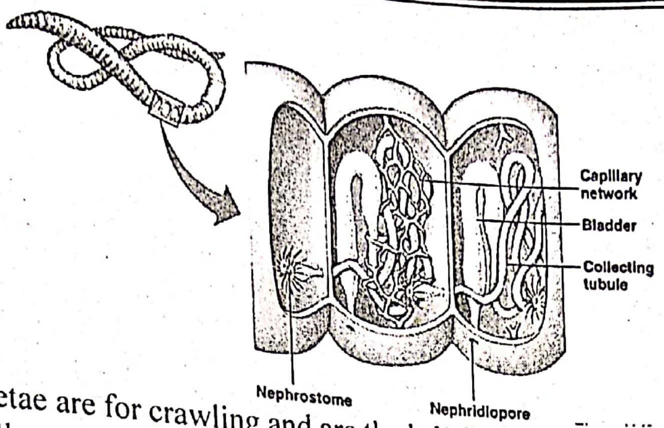
35.

Zoological name	Common name
Fasciola hepatica	Liver fluke
Enterobius vermicularis	Pin worm
Taenia solium	Tape worm
Aurelia aurita	Jelly fish

36. The nematode nervous system consists of a set of neuronal processes that run lengthwise on the nematode body. These processes consist of neurons that have a cell body also known as a neurocyte. A group of neurocytes is called a ganglion. These ganglion connect to the nerve ring which surrounds the Pharynx.

37. In shelled molluscs, the mantle is the organ that forms the shell, and adds to the shell to increase its size and strength as the animal grows. Shell material is secreted by the ectodermic (epithelial) cells of the mantle tissue.

38.



39. Locomotory setae are for crawling and are the bristles that are visible on the exterior of the earthworm. Slow creeping movements of Nereis are carried out by the action of parapodia only.

40. More than 50% of total biodiversity of our planet is formed by the Arthropods.

41. Natural silk is fibrous protein produced by larvae of silk worm.

42. Scavengers are those animals that feed on dead animals and plants e.g. *Drosophila* and Vulture.

43. Arthropods are proterostomes in which cleavage is determinate (fate of blastomeres is foretold). Each blastomere developed into its special structure.

44. The *Mesozoic Era* is an interval of geological time from about 252 to 66 million years ago. It is also called the Age of *Reptiles*.

45. Birds do not have teeth. Birds "chew" their food in their gizzard

46. A *poikilotherm* is an animal whose internal temperature varies considerably. It is the opposite of a *homeotherm*, an animal which maintains thermal homeostasis. Spiny ant eater belongs to homeotherm.

47. The lower jaw of mammals consists of only one bone, the dentary, and the jaw hinge connects the dentary to the squamosal (flat) part of the temporal bone in the skull. Working together, these muscles permit up-and-down and side-to-side movements of the jaw, making chewing possible which is unique to mammals.

PAST PAPER QUESTIONS

48. Sheep is the primary host of liver fluke.

49. *Dugesia* are carnivores, and they eat other small invertebrates and dead or decaying animals.

50. Adult *Ascaris* worms inhabit the lumen of the small intestine, usually in the jejunum or ileus. They have a life span of 10 months to 2 years and then are passed in the stool.

51. Polymorphism refers to the occurrence of structurally and functionally more than two different types of individuals within the same organism. It is a characteristic feature of Cnidarians (Coelenterates), particularly the polyp and medusa forms, or of zooids within colonial organisms like those in Hydrozoa.

52. The body of a platyhelminth (or tapeworm) consists of not only the ectoderm and the endoderm but also the mesoderm.

53. In arthropods, the body cavity is in the form of haemocoel.

54. *Fasciolahepatica*, also known as the common liver fluke lives in bile duct.

55. *Ascaris* worms inhabit the lumen of the small intestine, usually in the jejunum or ileus. They have a life span of 10 months to 2 years and then are passed in the stook.

56. Polymorphism refers to the occurrence of structurally and functionally more than two different types of individuals within the same organisB. It is a characteristic feature of Cnidarians (Coelenterates), particularly the polyp and medusa forms, or of zooids within colonial organisms like *Obelia*.

57. In radial symmetry all body parts are arranged around the central axis. Radial symmetry represents sessile mode of life.

58. *Ascaris* belong to the phylum Nematoda of super phylum Aschelminthes. They have a cylindrical body without showing any metamerism, a pseudocoel (false coelom) and a complete digestive tract lined by endodermal epithelium.

59. *Taenia* is a genus of *tapeworms* (a type of Platyhelminth) that includes some important parasites of livestock.

60. The major part of the tapeworm is called strobila and it consists of segments, proglottids. They each contain both male and female reproductive organs.

61. *Ascaris* worms inhabit the lumen of the small intestine of human and pig.

62. Snails are the intermediate hosts of *Fasciola hepatica*.

63. *Ascarislumbricoides* worms inhabit the lumen of the small intestine of human and pig.

64. Examples of acoelomates are found in the kingdom Animalia and the phylum Platyhelminthes. Commonly known as flatworms, these invertebrate animals are unsegmented worms with bilateral symmetry.

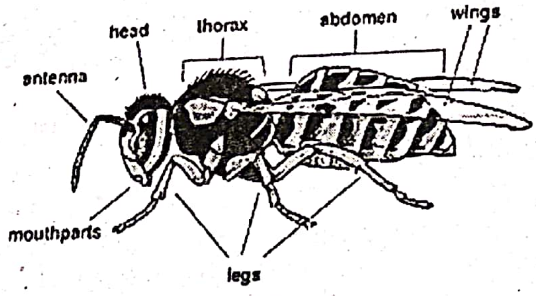
65. Metatheria includes marsupials that possess a pouch and give birth to partially developed young ones. Well-known marsupials include kangaroos, wallabies, koalas, opossums, wombats, Tasmanian devils, and the extinct thylacine.

66. Trochophore, also called trochosphere, small, translucent, free-swimming larva characteristic of marine annelids and most groups of mollusks.

67. **Platyhelminthes have the following important characteristics:**
- ✓ They are triploblastic, acoelomate, and bilaterally symmetrical.
- ✓ They may be free-living or parasites.
- ✓ The body has a soft covering with or without cilia.
- ✓ Their body is dorsoventrally flattened without any segments and appears like a leaf.

68. *Pheretima* is a genus of earthworms found mostly in New Guinea and parts of Southeast Asia.

69.



70. **Top 5 Characteristics of Reptiles**
- ✓ Reptiles Are Four-Legged Vertebrate Animals.
- ✓ Most Reptiles Lay Eggs.
- ✓ The Skin of Reptiles Is Covered with Scales.
- ✓ Reptiles Have Cold-Blooded Metabolisms.
- ✓ Reptiles Breathe with the Aid of Lungs.

71. Word Platyhelminthes (derived from the Greek platy, meaning "flat" while helminth, meaning "worm") are a phylum of relatively simple bilaterian, unsegmented, soft-bodied invertebrates.

7
TOPIC

ENZYMES
PRACTICE EXERCISE

TOPIC-WISE MCQs

Q.1 If enzymes stop their functions, then biochemical reactions would:
A. Stop
[✓ B. Be slowed down]
C. Not affected
D. Carried out at faster rate

Q.2 All of the following are true for an enzyme except:
A. Is a globular protein
[✓ B. Increase energy of activation]
C. Remain unchanged after reaction
D. Speed up the reaction

Q.3 Enzymes catalyze all of the followings except:
A. Digestion
B. Cellular respiration
C. Photosynthesis
[✓ D. Breathing]

Q.4 The reaction takes place in a small part of the enzyme called:
A. Allosteric site
B. Globular site
C. Reactive site
[✓ D. Active site]

Q.5 The lower activation energy, the _____ reaction will be.
[✓ A. Faster]
B. Moderate
C. Slower
D. Both a and b

Q.6 Coenzymes are closely related to:
A. Hormones
B. Antibodies
C. Inhibitors
[✓ D. Vitamins]

Q.7 Deficiency of vitamin B results in:
[✓ A. Beriberi]
B. Autism
C. Scurvy
D. Anemia

Q.8 The atoms, groups of atoms and molecules that join with enzymes altering their shape and making them functional:
A. Substrate
B. Prosthetic Group
C. Coenzymes
[✓ D. Cofactors]

Q.9 If the cofactor is a non-protein like a metallic ion, it is referred to as a:
A. Apoenzyme
B. Coenzymes
[✓ C. Activator]
D. Prosthetic group

Q.10 Non-protein part which is organic in nature and detachable is called:
A. Activator
[✓ B. Coenzyme]
C. Cofactor
D. Prosthetic group

Q.11 The effect of reversible competitive inhibitor can be neutralized by increasing the concentration of:
[✓ A. Substrate]
B. Activator
C. Enzyme
D. Inhibitor

Q.12 Function of succinate dehydrogenase is aided by:
A. NAD^+
B. Metal ion
[✓ C. FAD]
D. Vitamin

Q.13 Prosthetic groups are:
A. Metallic ions
B. Inorganic molecules
[✓ C. Organic molecules]
D. Radicals

Q.14 **Most of the enzymes are:**
[✓ A. Attached with organelles]
B. In cytoplasm
C. Free floating
D. In coagulated form

Q.15 **Enzymes related to fatty acids oxidation are present in/at:**
A. Plasma membrane
B. Chloroplast
[✓ C. Mitochondria]
D. Nucleolus

Q.16 **Optimum pH value for pancreatic lipase is:**
A. 7.60
[✓ B. 9.00]
C. 8.00
D. 9.70

Q.17 **ES complex is converted into product by:**
A. Cofactor
B. Coenzyme
[✓ C. Catalytic site]
D. Binding site

Q.18 **_____ suggested that each enzyme had a particular shape into which the substrate fit exactly.**
A. Koshland
B. Robert Wittaker
[✓ C. Emil Fischer]
D. Michael Menten

Q.19 **The concentration of substrate molecule is higher than enzymes then rate of reaction would be:**
A. Increasing
B. Decreasing
[✓ C. Remain constant]
D. Variable

Q.20 **Optimum pH of enterokinase is:**
[✓ A. Slightly acidic]
B. Highly acidic
C. Slightly basic
D. highly basic

Q.21 **Allosteric enzymes have _________ major sites.**
A. 1
B. 3
[✓ C. 2]
D. 4

Q.22 **Which of the following properties of amino acids is affected by a change in pH?**
A. Oxidation of amino acids
B. Atomization of amino acids
C. Reduction of amino acids
[✓ D. Ionization of amino acids]

Q.23 **Change in temperature from 30°C to 40°C in human body will cause:**
A. Increase in rate of reaction
B. Decrease in rate of reaction
[✓ C. First increase then decreases in rate of reaction]
D. First increase then become constant

Q.24 **Which of the following factor does not affect the rate of enzyme action?**
A. Enzymes concentration
B. Substrate concentration
[✓ C. Light intensity]
D. Temperature

Q.25 **All of the followings are organic in nature except:**
A. Holoenzyme
[✓ B. Activator]
C. Co-enzyme
D. Prosthetic group

PAST PAPER MCQs

Q.26 All co-enzymes are derived from: (MDCAT 2014)

A. Proteins

B. Metal ions

C. Carbohydrates

[✓ D. Vitamins]

Q.27 A co-factor tightly bound to the enzyme on the permanent basis is called: (MDCAT 2014)

A. Activator

[✓ B. Prosthetic group]

C. Co-enzyme

D. Apo-enzyme

Q.28 Which one of the following is the optimum pH of pancreatic lipase enzyme? (MDCAT 2014)

A. 7.60

[✓ B. 9.00]

C. 8.00

D. 9.70

Q.29 The competitive inhibitors have structural similarity with: (MDCAT 2014)

A. Active site

[✓ B. Substrate]

C. Binding site

D. Co-enzyme

Q.30 An enzyme required Mg^{+2} to catalyze the substrate. The Mg^{++} is best identified as: (MDCAT 2019)

A. Prosthetic group

B. Co-enzyme

[✓ C. Activator]

D. Inhibitor

Q.31 According to ________ model, the active site of enzyme is modified as the substrate interacts with enzyme. (MDCAT 2019)

[✓ A. Induced fit]

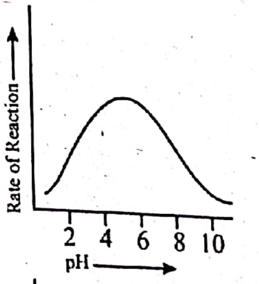
B. Emil Fischer

C. Lock and key

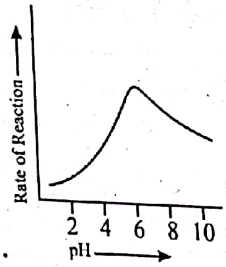
D. Fluid mosaic

Q.32 Which one of the following graphs shows how the rate of reaction of pepsin is affected by pH? (MDCAT 2019)

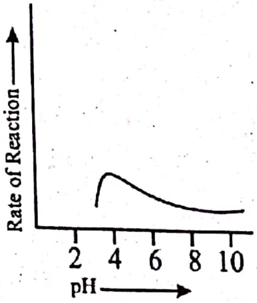
A.



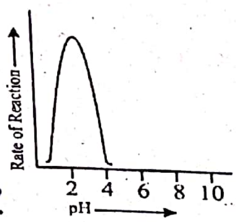
B.



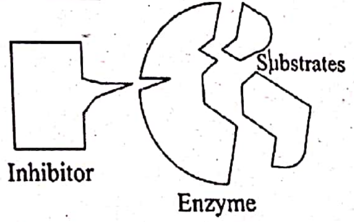
C.



[✓ D.]



Q.33 This figure represents ________ inhibitor. (MDCAT 2019)



[✓ A. Non-competitive]

B. Irreversible

C. Competitive

D. Isosteric

Q.34 All enzymes are__________. (MDCAT 2017)
A. Fibrous proteins
B. Lipoproteins
C. Low molecular weight proteins
[✓ D. Globular proteins]

Q.35 The reactants on which enzyme work are: (MDCAT 2017)
A. Products
[✓ B. Substrates]
C. Metabolites
D. Catabolites

Q.36 Which of the following comprises of inorganic ions? (MDCAT 2017)
A. Coenzymes
B. Prosthetic group
[✓ C. Activators]
D. Apoenzyme

Q.37 What is true about enzymes? (MDCAT 2017)
A. Fibrous proteins
[✓ B. No effect on end product]
C. Use in reaction
D. Non-specific

Q.38 Modified form of Lock and model was proposed by: (MDCAT 2017)
[✓ A. Koshland]
B. Watson
C. Fischer
D. Rosalind Franklin

Q.39 Which of the following type of inhibitor can be neutralize by adding more substrate into reaction? (MDCAT 2017)
A. Irreversible inhibitor
B. Irreversible non-competitive
[✓ C. Reversible inhibitor]
D. Irreversible competitive

Q.40 A non-protein part essential for proper and essential functioning of enzyme is called: (MDCAT 2018)
A. Extra factor
B. Efficient cofactor
C. Additional factor
[✓ D. Cofactor]

Q.41 The temperature that promotes the maximum activity of enzyme is referred as: (MDCAT 2018)
A. Fixed temperature
B. Controlled temperature
[✓ C. Optimum temperature]
D. Active temperature

Q.42 If molecule can bind to another site of the enzyme rather than the true active site, it is referred as ________. (MDCAT 2018)
[✓ A. Non-competitive inhibitors]
B. Competitive inhibitors
C. Allosteric inhibition
D. Irreversible inhibition

Q.43 The main difference between catalysts and enzymes is: (ETEA 2018)
A. Enzymes are sharp in action than catalyst
B. Catalysts used in large amount than enzymes
[✓ C. Catalysts are inorganic while enzymes are organic in nature]
D. Enzymes need p11 while catalysts do not

Q.44 The type of energy reduced by the enzymes for biological reactions to occur is called the: (MDCAT 2019)
A. Light Energy
B. Active Energy
[✓ C. Activation Energy]
D. Heat Energy

Q.45 What is common in both competitive and non-competitive inhibition? (MDCAT 2019)
A. Irreversible inhibition
[✓ B. Reversible inhibition]
C. Feedback inhibition
D. Non-Reversible inhibition

Q.46 A student of chemical engineering mistakenly engulfed the toxic compound "A" which was a potent inhibitor of certain enzyme. He was immediately brought to hospital where Dr. injected intravenously substrate "B" to minimize the toxic effect of compound A. His life was saved from serious damages. The treatment method shows that compound A was a ________ inhibitors. (MDCAT 2019)
A. Temperature sensitive
B. Irreversible
[✓ C. Competitive reversible]
D. Non-competitive reversible

Q.47 With the increase of enzyme concentration in a reaction more____ is/are available for the substrate. **(AJK 2019)**

[✓ A. Binding sites]
B. Products
C. Active sites
D. Activation energy

Q.48 Which type of bonds is mostly affected in an enzyme molecule when there are pH fluctuations? **(AJK 2019)**

[✓ A. Ionic bonds]
B. Disulphide bonds
C. Hydrogen bonds
D. Peptide bond

Q.49 Lock and key model for enzyme action proposed by Emil Fischer suggests that: **(PMC 2020)**

A. Enzymes are unbiased for substrate
B. Enzymes can modify their active sites
[✓ C. Enzymes are restricted to one reaction type]
D. Enzyme can catalyze variety of reactions

Q.50 Most enzymes have an optimum temperature of around: **(PMC 2020)**

A. 30°C
B. 50°C
[✓ C. 40°C]
D. 20°C

Q.51 Enzymes work by lowering the __________ of the reactions they catalyze. (PMC 2020)

A. Kinetic energy
[✓ B. Activation energy]
B. Heat energy
D. Potential energy

Q.52 Phosphatases belong to which group of the following? **(ETEA 2019)**

A. Lyases
B. Ligase
[✓ C. Hydrolases]
D. None of the above

ANSWER KEY

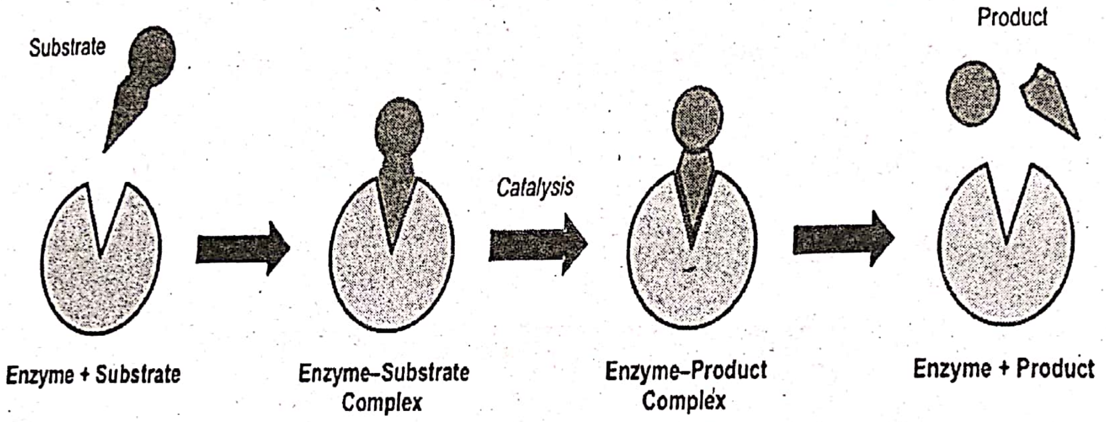
TOPIC-WISE MCQs & PAST PAPER MCQs

1	B	11	A	21	C	31	A	41	C	51	C
2	B	12	C	22	D	32	D	42	A	52	C
3	D	13	C	23	C	33	A	43	C		
4	D	14	A	24	C	34	D	44	C		
5	A	15	C	25	B	35	B	45	B		
6	D	16	B	26	D	36	C	46	C		
7	A	17	C	27	B	37	B	47	A		
8	D	18	C	28	B	38	A	48	A		
9	C	19	C	29	B	39	C	49	C		
10	B	20	A	30	C	40	D	50	C		

EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

1. The biological processes that occur within all living organisms are chemical reactions, and most are regulated by enzymes. In the presence of enzymes these chemical reactions carried out at faster rate, while in the absence they will be slow down.
2. Enzymes are the biological catalyst which speed up rate of chemical reaction by lowering energy of activation.
3. Breathing (or ventilation) is the process of moving air out and in the lungs to facilitate gas exchange with the internal environment, mostly to flush out carbon dioxide and bring in oxygen. There is no involvement of any enzyme to carried out breathing.
4.



5. Enzymes are the biological catalyst which speed up rate of chemical reaction by lowering energy of activation.
6. Because many of the coenzymes are derived from the vitamins, e.g. NAD is a coenzyme and is derived from vitamins.
7. Beriberi is a disease caused by a vitamin B deficiency, also known as thiamine deficiency. Scurvy is due to deficiency of vitamin C. Autism is a developmental disorder characterized by difficulties with social interaction and communication, and by restricted and repetitive behavior.
8. A cofactor is a non-protein chemical that assists with a biological chemical reaction. Co-factors may be metal ions, organic compounds, or other chemicals that have helpful properties not usually found in amino acids.
9.

Apoenzyme	An enzyme without its non-protein part.
Coenzyme	If non-protein part loosely attached to protein part of enzyme. It is organic in nature.
Activator	If non-protein part loosely attached to protein part of enzyme. It is inorganic in nature.
Prosthetic group	If non-protein part covalently attached to protein part of enzyme.

10.

Cofactor	Non-protein chemical that assists with a biological chemical reaction. It may be organic or inorganic.
Coenzyme	If non-protein part loosely attached to protein part of enzyme. It is organic in nature.
Activator	If non-protein part loosely attached to protein part of enzyme. It is inorganic in nature.
Prosthetic group	If non-protein part covalently attached to protein part of enzyme.

11. Addition of more substrate molecules will replace inhibitors, and will bind with the active site of the enzyme and results in increase in rate of reaction.

12. During the conversion of the succinic acid into fumaric acid, FAD^+ is reduced by gaining two hydrogens from succinic acid which are liberated by succinate dehydrogenase.

13. Inorganic cofactors are activators while organic cofactors may be coenzymes or prosthetic group.

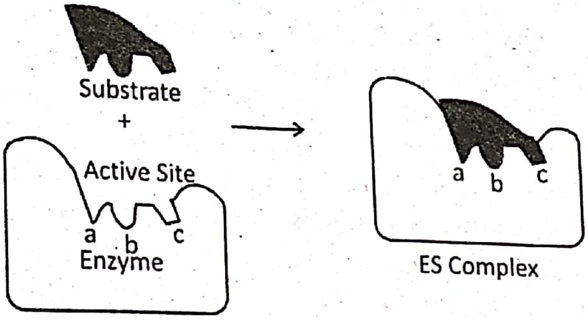
14. The membrane-bound organelles contain a variety of enzymes called hydrolases that can digest proteins, nucleic acids, lipids, and complex sugars. But many enzymes are present in cytoplasm of cell.

15. Fatty acid metabolism is the function of mitochondria, while synthesis of lipids is the function of SER.

16. Pancreatic enzymes mostly work in an alkaline pH which helps in the digestion of food in small intestine. The optimum pH for the working of pancreatic lipase is 9.00

17. Active site contains two sites binding site and catalytic site. Binding site is responsible for the formation of ES complex. After the formation of this complex catalytic site is activated and it converts ES complex into products.

18.



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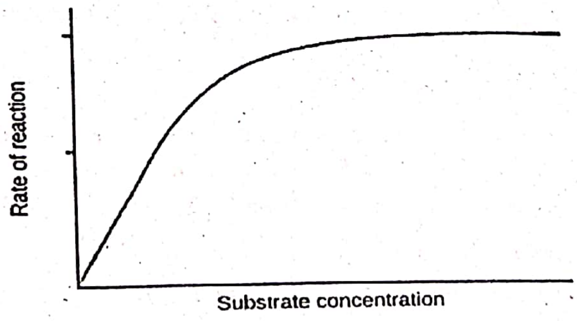


20. Optimum pH of enterokinase is 5.50 which is slightly acidic

21. Along the active site for the attachment of substrate, allosteric enzymes also have another site where a molecule that is not a substrate may bind and regulate the enzyme action.

22. Change in pH causes the imbalance of H^+/OH^- ions which causes the ionization of amino acids at the active sites and substrate as well.
23. The optimum temperature for the enzymes in human body is 37°C. When the temperature is increased from 30°C, the rate of reaction is also increased. At 37°C the rate of reaction is maximum. If the temperature further increases, the rate of reaction decreases due to denaturation of enzymes at high temperature.
24. Rate of reaction effects by substrate concentration, temperature, pH and enzyme concentration.
25. Activators are inorganic in nature.
26. Co-enzymes are closely related to vitamins, which represent the essential raw materials from which coenzymes are made. Only small quantities of vitamins are needed because, like enzymes, co-enzyme can be used again and again.
27. The detachable co-factor is known as an activator if it is an inorganic ion. If the non-protein part is covalently bonded, it is known as a prosthetic group. If it is loosely attached to the protein part, it is known as coenzyme. Enzyme with its cofactor is removed is called apoenzyme.
28. Optimum pH values for the catalytic activity of catalase, chymotrypsin, pancreatic lipase and arginase are 7.60, 7.00-8.00, 9.00 and 9.70, respectively.
29. Non-competitive reversible inhibitors block allosteric site of enzyme while competitive reversible inhibitors have structural similarity with substrate and they bind active site of enzyme.
30. Some enzymes use metal ions as co-factors like Mg^{+2}, Fe^{+2}, Cu^{+2}, Zn^{+2} etc. The detachable co-factor is known as an activator if it is an inorganic ion.
31. According to induce fit model, when a substrate combines with an enzyme, it induces changes in the enzyme structure. The change in structure enables the enzyme to perform its catalytic activity more efficiently.
32. Every enzyme work best at its optimum pH. Pepsin optimum pH is 2. Above 2 pH pepsin will be denatured.
33. Non-competitive inhibitor binds allosteric site of enzyme rather than active site.
34. Enzymes are composed of hundreds of amino acids joined together and coiled upon themselves to form a globular structure.
35. A substrate is a molecule acted upon by an enzyme. When substrates bind to enzymes, they undergo an enzyme induced chemical change, and are converted to products.
36. Some enzymes use metal ions as co-factors like Mg^{2+}, Fe^{2+}, Cu^{2+}, and Zn^{2+} etc. The detachable co-factor is known as an activator if it is an inorganic ion while coenzyme, apoenzyme and prosthetic group are organic in nature.
37. Enzymes are globular proteins which act as biocatalyst and speed up biochemical reactions and their presence does not affect the nature of properties of end product/s.
38. Modified form of lock and key model is called induced fit model which was proposed by D. Koshland. According to this model, when a substrate combines with an enzyme, it induces changes in the enzyme structure.
39. Reversible inhibitors can form weak linkages with the enzyme. Their effect can be neutralized completely or partly by an increase in the concentration of the substrate.
40. Some enzymes consist solely of proteins. Others also have a non-protein part known as a co-factor, which is essential for the proper functioning of the enzymes. The cofactor usually acts as 'bridge' between the enzyme and its substrate.
41. All enzymes can work at their maximum rate at a specific temperature called as optimum temperature. For enzymes of human body, 37°C is the optimum temperature.
42. Non-competitive reversible inhibitor blocks allosteric site of enzyme while competitive inhibitor has structural similarity with substrate and they bind active site of enzyme.

43.

Catalyst	Enzyme
Catalysts are simple inorganic molecules.	Enzymes are complex proteins.
Inorganic catalyst.	Organic catalyst or bio catalyst.
Reaction rates typically slower.	Reaction rates several times faster.

44. The minimum amount of energy requires to start a chemical reaction is called activation energy. Enzymes speed up reaction by lowering its activation energy.
45. Both competitive and non-competitive inhibitors are types of reversible inhibitor and their effect can be neutralizing by adding small amount of substrate.
46. Reversible inhibitors form weak linkages with the enzyme. Their effect can be neutralized completely or partly by an increase in the concentration of the substrate. Since the student was recovered after injected substance 'B', it means that substance 'B' is the original substrate of that enzyme which has been competitively blocked by substance 'A'.
47. When enzyme molecules increase there will be more active sites available for the binding of more substrates, due to which reaction rate will further increase.
48. Hydrogen bond will have affected due to increase in temperature than optimum value, while change in pH will affect ionic bond.
49. According to lock and key model every enzyme is specific due to its active site for its substrate. So every enzyme can convert only its specific substrate into product.
50. Because the optimum temperate of human body is around to 37°C so, most of the enzymes work around this temperature with their maximum efficiency.
51. An enzyme binds to its specific substrate by its catalytic site and transforms its substrate into product. So this pathway lowers the activation energy.
52. Lyases and ligases are enzymes involved in catalyzing biochemical reactions. The main difference between lyases and ligases is that lyases break chemical bonds in order to form new compounds whereas ligases form chemical bonds in order to combine different compounds.

8 TOPIC EVOLUTION PRACTICE EXERCISE

TOPIC-WISE MCQs

Q.1 Series of changes in the genetic composition of a population over time is called:
A. Revolution
B. Population genetics
[✓ C. Evolution]
D. Succession

Q.2 Product of evolution is:
A. Ecosystem
B. Community
C. Biome
[✓ D. Species]

Q.3 Who developed a theory of natural selection essentially identical to Darwin's?
A. Hardy-Weinberg
B. Malthus
[✓ C. Alfred Wallace]
D. Lyell

Q.4 Adaptations that an organism acquires by its own actions are:
A. Heritable
[✓ B. Not heritable]
C. Can be made heritable through some modifications
D. Both heritable and not heritable

Q.5 Lamarck presented a mechanism to explain:
A. How earth formed
[✓ B. How specific adaptations evolved]
C. How life started
D. How life changed

Q.6 Which one is according to Lamarckism is true?
A. Variation→adaptations→inheritance
B. Recombination → variation → adaptations
[✓ C. Adaptations→variation→inheritance]
D. Mutations →variations → adaptations

Q.7 Which statement is contradictory to Lamarckism?
A. Acquired characteristics can be passed to offspring
B. Extensive usage causes hypertrophy
C. Disuse causes atrophy
[✓ D. Acquired characteristics can't be inherited]

Q.8 Unique fauna was observed by Darwin in:
A. Ecuador
B. Bahamas
[✓ C. Galapagos]
D. Maldives

Q.9 Darwin perceived origin of new species and _________.
A. Fixation
B. Stabilization
[✓ C. Adaptation]
D. Maladaptation

Q.10 What is the perception of Darwin about unity of life?
[✓ A. All organisms descent from a common ancestor]
B. All organisms are created specially by a divine force
C. All organisms share a common biological composition
D. All organisms arise from nonliving things

Q.11 According to Darwin ________ become better adapted to local environment through natural selection.
A. Regional community
B. Ecosystem
[✓ C. Population]
D. Flora

Q.12 Survival is only for the fittest is true for:
A. Artificial selection
B. Descent with modification
[✓ C. Natural selection]
D. Revolution

Q.13 Survival in the struggle for existence depends upon:
A. Physical environment
B. Hereditary constitution
C. Chemical constituents
D. Environmental resources

Q.14 How many types of finches were observed by Darwin at Galapagos Island?
A. 12
B. 13
C. 11
D. 10

Q.15 Which one is related to natural selection?
A. More people → more resources → no competition
B. More people → less resources → more competition
C. Less people → more resources → no competition
D. Less people → less resources → no competition

Q.16 Darwin's theory of evolution was mainly based on the evidences from______.
A. Geographical distribution and fossil record
B. Fossil record and Embryology
C. Geographical distribution and comparative anatomy
D. Paleontology and Geology

Q.17 The Finches of Galapagos Islands provide evidence in favor of:
A. Evolution due to mutation
B. Evolution due to biogeography
C. Retrogressive evolution
D. Special creation.

Q.18 Modern biological sciences suggest that ________ are the ancestors of all life forms.
A. Protists
B. Prokaryotes
C. Protozoans
D. Parazoans

Q.19 Over many years two population could become dissimilar enough to be designated as separate species that is applied upon:
A. Galapagos finches
B. Giant Turtle
C. Black smith bicep
D. Giraffe neck

Q.20 Neo-Darwinism has integrated discoveries and ideas from all except:
A. Taxonomy
B. Genetics
C. Paleontology
D. Serology

Q.21 _____ provides a visual records in a complex series showing the evolution of an organism.
A. Comparative anatomy
B. Comparative embryology
C. Fossils record
D. Electron microscopy

Q.22 Which of the following is not an example of disuse of organs?
A. Snake's feet
B. Shedding of teeth
C. Muscle atrophy
D. Movement of ear

Q.23 All of the following are related to evolution except:
A. Change over time
B. Muscle hypertrophy
C. Antibiotic resistance in bacteria
D. Origin of new species

Q.24 The presence of gill slits, in the embryos of all vertebrates, supports the theory of:
A. Metamorphosis
B. Recapitulation
C. Organic evolution
D. Biogenesis

Q.25 Which is not related to the idea of use and disuse:
A. Extensively used body parts become longer and strong
B. Disused body parts deteriorated
C. Bigger bicep of black smith
D. Different type of beaks present in finches

Q.26 Which is not a geographical barrier?
A. Ocean
B. Low land
C. Mountains
D. Atmosphere

Q.27 Which is not a character of fossils?
A. Actual remains of ancient organisms
B. Living
C. Traces of ancient organisms
D. May be embedded in sand, resin or ice

Q.28 Functionally different but structurally alike organs are:
A. Analogous
[✓ B. Homologous]
C. Anamolous
D. Cosmopolitan

Q.29 Analogous organs help organism to live in:
[✓ A. Same habitat]
B. Different biomes
C. Different habitats
D. Environment

Q.30 Which one of the following statement could not be used to describe a species:
A. A group with similar autosomes
[✓ B. A group with analogous structures]
C. A group capable of producing viable offsprings
D. A group sharing same niche

Q.31 Which one of the following statements is correct?
A. There is no evidence of the existence of gills during embryogenesis of mammals
B. All plant and animal cells are totipotent
[✓ C. Ontogeny repeats phylogeny]
D. Stem cells are specialized cells

Q.32 When two species of different genealogy come to resemble each other as a result of adaptation, the phenomenon is termed?
A. Microevolution
[✓ B. Convergent evolution]
C. Co-evolution
D. Divergent evolution.

Q.33 The actual remains or traces of organisms that lived in ancient geological times:
A. Vestigial remains
B. Fuel
[✓ C. Fossils]
D. Analogous organs

Q.34 In humans gill pouches have modified into:
A. Nose
[✓ B. Eustachian tubes]
C. Ear
D. External ear

PAST PAPER MCQs

Q.35 Vestiges of vestigial organs are those organs which have ceased to be of any use in their possessor but they persist to reduce from generation after generation. In man they are: (KMDC 2014)
A. vermiform appendix
B. Coccyx
C. Nicitating
D. Ear muscles
[✓ E. All of these]

Q.36 Change in frequency of alleles at a locus that occurs by chance is called: (MDCAT 2017)
A. Mutation
B. Non-random mating
C. Migration
[✓ D. Genetic drift]

Q.37 Which of the following factor causes change in gene frequency? (MDCAT 2017)
A. Meiosis
[✓ B. Mutation]
C. Sexual recombination
D. Random mating

Q.38 **According to the theory of natural selection, organisms produce:** **(MDCAT 2017)**

[✓ A. More offspring than supported]
B. Less offspring than supported
C. Offspring according to the resources available
D. Offspring to create resources

Q.39 **Which animals support Darwin's view of inheritance of desirable variation?** **(NTS 2019)**

A. Giraffe
[✓ B. Galapagos finches]
C. Snake
D. All of these

Q.40 **This theory says that mitochondria and chloroplasts are in fact ancient bacteria which now live inside the larger cells:** **(PMC 2020)**

A. Darwin's theory of evolution
B. Neo Darwinism
C. Lamarckism
[✓ D. Endosymbiont theory]

Q.41 **The organs which are similar in function but different in structure, are called:** **(PMC 2020)**

[✓ A. Analogous organs]
B. Convergent evolution
C. Homologous organs
D. Divergent evolution

Q.42 ________ **occurs because natural selection gives some alleles a better chance of survival than others.** **(PMC 2020)**

A. Fitness
B. Crossing over
[✓ C. Evolution]
D. Artificial selection

ANSWER KEY

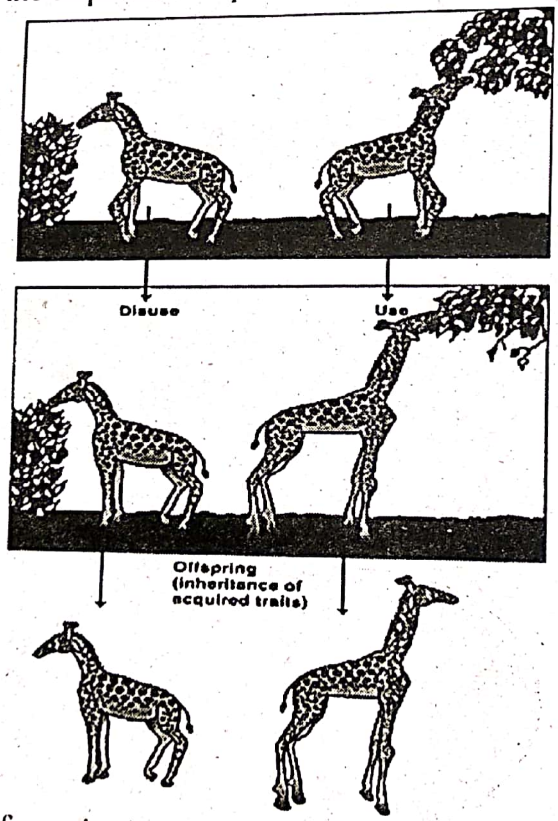
TOPIC-WISE MCQs & PAST PAPER MCQs

1	C	11	C	21	C	31	C	41	A
2	D	12	C	22	B	32	B	42	C
3	C	13	B	23	B	33	C		
4	B	14	B	24	B	34	B		
5	B	15	B	25	D	35	E		
6	C	16	A	26	D	36	D		
7	D	17	B	27	B	37	B		
8	C	18	B	28	B	38	A		
9	C	19	A	29	A	39	B		
10	A	20	D	30	B	40	D		

EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

1. Evolution is heritable change in characteristics of biological populations over successive generations. Evolutionary processes give rise to biodiversity at every level of biological organization.
2. Final Product of evolution is always species and it is smallest unit of classification.
3. The research of British naturalist Alfred Russel Wallace (1823-1913) played a pivotal role in developing the theory of natural selection as it had the same theme to that of Darwin. But he attributes his work to Charles Darwin.
4. Darwin's theory has been supported by a lot of evidence. Lamarck's Theory of Inheritance of Acquired Characteristics has been disproved. This was done in two major ways. The first is by experiment. We have seen through many real examples and observations that changes which occur in an animal during life are not passed on to the animal's offspring. If a dog's ears are cropped short, its puppies are still born with long ears. If someone exercises every day, runs marathons, eats well, and is generally very healthy, the fitness is not passed on and the person's children still have to work just as hard to get that fit and healthy, because only germ cell mutation are inherited.
5. Lamarckism is the hypothesis that an organism can pass on characteristics that it has acquired during its lifetime to its offspring as well as how specific adaptations evolve.
6. As we can observe the sequence Adaptations➔ Variations➔ Inheritance.



7. The inheritance of acquired characteristics is a hypothesis that physiological changes acquired over the life of an organism may be transmitted to offspring and option D is contradictory to hypothesis.
8. Darwin visited the Galapagos Islands and observed unique fauna of this land.

9. After returning to Britain, Darwin perceived the origin of new species and adaptations as closely related processes for evolution.
10. The phrase descent with modification summarized Darwin's perception of the unity of life. The phrase refers to the view that all organisms are related through descent from an ancestor that lived in the remote past. In the Darwinian view, the history of life is like a tree with branches representing life's diversity.
11. Natural selection is the differential survival and reproduction of individuals (population) due to differences in phenotype. It is a key mechanism of evolution, the change in the heritable traits characteristic of a population over generations.
12. During artificial selection only fittest organisms are selected, while during natural selection survival restricts for the fittest organisms as they have such inherited characteristics which make them fit for their environment and leave more offspring than the less fit individuals.
13. Survival in struggle for existence depends upon hereditary constitutions and good variations.
14. From Galapagos Islands, Darwin collected 13 types of finches because these were although quite similar, seemed to be different species.
15. Logically when there are more people and fewer resources, there shall be high competition for struggle of existence and people with better inherited characteristics will be selected naturally
16. Darwin's theory of evolution was mainly based on the evidences from biogeography and fossil record as he observed and collected these evidences from expedition
17. Biogeographical evolution is a process in which gene pool of a population gradually changes in response to environmental pressures, natural selection and genetic mutations.
18. The oldest known fossil belongs to prokaryotes which suggest that they are the ancestors of all life forms.
19. Allopatric speciation is speciation that happens when two populations of the same species become isolated from each other due to geographic changes. Speciation is a gradual process by which populations evolve into different species and Galapagos finches are example of allopatric speciation.
20. The theory of evolution as expounded by later students of Charles Darwin, especially Weismann, holding that natural selection accounts for evolution and denying the inheritance of acquired characters and includes most of the advance sciences like Taxonomy, Palaeontology and Genetics but not serology (study of blood).
21. A fossil is any preserved remains, impression, or trace of any once-living thing from a past geological age. The totality of fossils is known as the fossil record.
22. Shedding of deciduous teeth is a term given to describe the physiological process that ultimately leads to replacement of the deciduous teeth by their corresponding permanent teeth and it is not an example of disuse of organs
23. Muscle hypertrophy involves an increase in size of skeletal muscle through an increase in size of its component cells, i.e. increased storage of glycogen etc.
24. The theory of recapitulation, also called the biogenetic law or embryological parallelism—often expressed using Ernst Haeckel's phrase "ontogeny recapitulates phylogeny"—is a historical hypothesis that the development of the embryo of an animal, from fertilization to gestation or hatching (ontogeny), goes through similar stages and presence of gill slits in all vertebrate embryos is one of the best example of this theory.
25. Darwin's finches are a classical example of an adaptive radiation. Their common ancestor arrived on the Galapagos about two million years ago. During the time that has passed Darwin's finches have evolved into 13 recognized species differing in body size, beak shape, song and feeding behavior.
26. A geographical barrier is something that blocks the pathway to something, this can be any natural feature such as mountains that prevents easy movement from one place to another and atmosphere is not a geographical barrier.

27. A fossil is any preserved remains, impression, or trace of any once-living thing from a past geological age.
28. Homology in Animals. Organs such as bat's wing, wings of birds, seal's flipper, forelimb of a horse, and human arm have a common underlying anatomy that was present in their last common ancestors; therefore, their forelimbs are homologous organs.
29. Analogous organs are the opposite of homologous organs, which have similar functions but different origins. An example of an analogous trait would be the wings of insects, bats and birds that evolved independently in each lineage separately but survive in same kind of habitat performing similar function.
30. Analogous organs are the opposite of homologous organs, which have similar functions but different origins. An example of an analogous trait would be the wings of insects, bats and birds that evolved independently in each lineage separately but survive in same kind of habitat performing similar function and are not used to define species
31. Haeckel (1810) proposed that developing animal embryo passes through stages resembling adult forms of its ancestors. E. Haeckel (1868, 1874) formulated biogenetic law or recapitulation theory which states that ontogeny (developmental history of an individual) repeats phylogeny (development history of races), all other are incorrect.
32. Convergent evolution is the process whereby organisms not closely related in origin, independently evolve similar traits as a result of having to adapt to similar environment or ecological niches. On a molecular level, this can happen due to random mutation unrelated to an adaptive change.
33. A fossil is any preserved remains, impression, or trace of any once-living thing from a past geological age. Examples include bones, shells, exoskeletons, stone imprints of animals or microbes, hair, petrified wood, oil, coal, and DNA remnants.
34. Ancestral characters are often, but not always, preserved in an organism's development. For example, both chick and human embryos go through a stage where they have slits and arches in their necks like the gill slits and gill arches of fish but in humans one of these gill pouches develop into Eustachian tubes.
35. All of the above are vestigial structures of man.
36. Genetic drift is a change in frequency of alleles at a locus that occurs by chance.
37. Following are the factors that affect allele frequency:
    - Mutation
    - Migration
    - Genetic Drift
    - Non-random Mating
    - Selection
38. According to theory of natural selection, those organisms whose inherited characteristics fit them best to their environment are likely to leave more offsprings than the less fit individuals.
39. Galapagos is an island where Darwin observed almost 13 types of finches with distinct traits.
40. According to the endosymbiotic theory, mitochondria of eukaryotes derive from eubacteria. The host may be more closely related to the Archaea. Following endosymbiosis gave rise to the chloroplasts of algae and plants.
41. Analogous organs are the opposite of homologous organs, which have similar functions but different origins. An example of an analogous trait would be the wings of insects, bats and birds that evolved independently in each lineage separately after diverging from an ancestor without wings.
42. Evolution occurs because natural selection gives some alleles a better chance of survival than others.

9 TOPIC

LIFE PROCESSES IN ANIMALS & PLANTS (NUTRITION/GASEOUS EXCHANGE/ TRANSPORT)

PRACTICE EXERCISE

TOPIC-WISE MCQs

NUTRITION

Q.1 All the insectivorous plants are:
A. Heterotrophic
[✓ B. Autotrophic]
C. Decomposers
D. Parasites

Q.2 End of leaf is modified to form a hood in:
[✓ A. *Sarracenia purpurea*]
B. *Drosera intermedia*
C. *Dionaea muscipula*
D. All of A, B, C

Q.3 Pick out the different:
[✓ A. Dodder]
B. Sundew
C. Venous fly trap
D. Pitcher plant

Q.4 Which one is different from others?
[✓ A. Amylase]
B. Glucagon
C. Gastrin
D. Insulin

Q.5 In which of the following types of animals would you expect the digestive tract to be more complex:
A. Those with single opening
B. Those with multiple openings
[✓ C. Those with two opening]
D. Those without any opening

Q.6 Cooking of the food and _______ in the mouth significantly improve the digestibility of food stuff by the enzymes.
[✓ A. Mastication]
B. Peristalsis
C. Churning
D. Acidity

Q.7 The digestion of carbohydrates occurs briefly in ________ and largely in the ______________respectively.
[✓ A. Mouth, intestine]
B. Stomach, intestine
C. Esophagus, mouth
D. Mouth, stomach

Q.8 On taking a spoonful of boiled rice and after partial digestion, which of the following biomolecule cannot be the part of bolus?
A. Protein
B. Vitamins
C. Amylose
[✓ D. Monosaccharide]

Q.9 How many sites of digestion are present in the digestive system of man?
[✓ A. 3]
B. 4
C. 5
D. 6

Q.10 Oral cavity is aided in selection of food by all of the following senses except:
A. Smell
B. Sight
[✓ C. Sound]
D. Taste

Q.11 Align the following events performed by oral cavity:
1) Digestion
2) Mastication
3) Lubrication
4) Selection
A. 1,3,4,2
B. 4,2,1,3
C. 4,3,2,1
[✓ D. 4,2,3,1]

Q.12 Main function of $NaHCO_3$ and other salts in buccal cavity is to:
A. Perform chemical digestion
[✓ B. Stabilize the pH]
C. Act as antiseptic agent
D. Act as promoter of Ptyalin

Q.13 All of the following are influenced by the movement of tongue except:
A. Nasal opening
[✓ B. Teeth cleansing]
C. Epiglottis
D. Peristalsis

Q.14 Peristalsis is the characteristic movement of ________ by which food is moved along.
A. Respiratory tract
B. Reproductive tract
[✓ C. Digestive tract]
D. Urinary tract

Q.15 Which of the following region in alimentary canal produces no enzyme?
[✓ A. Oesophagus]
B. Duodenum
C. Stomach
D. Jejunum

Q.16 More gastric juice is produced by gastric glands on the stimulation of a hormone:
A. Pepsinogen
B. Secretin
[✓ C. Gastrin]
D. Insulin

Q.17 Cardiac sphincter is present at the junction of stomach and:
[✓ A. Esophagus]
B. Duodenum
C. Caecum
D. Heart

Q.18 The digestive enzyme which is absent in adults:
[✓ A. Rennin]
B. Renin
C. Amylase
D. Enterokinase

Q.19 Which of the following layer regulates the peristaltic movement along the digestive tract?
[✓ A. Middle]
B. Innermost
C. Outermost
D. Connective tissue layer

Q.20 Pepsin hydrolyzes protein to yield:
[✓ A. NH_3]
B. Amino acids
C. Peptones and polypeptide
D. Dipeptides

Q.21 Which combination of the following food components in humans reaches the stomach undigested?
A. Starch, Proteins and Fats
B. Vitamins, Carbohydrates and Polypeptides
[✓ C. Proteins, Cellulose and Fats]
D. Proteins, Starch and Cellulose

Q.22 In the wall of alimentary canal, sequence from outer to inner is:
A. Serosa, longitudinal muscle, mucosa, sub-mucosa
B. Mucosa, serosa, muscles, epithelium
[✓ C. Serosa, longitudinal muscles, circular muscles, sub-mucosa, mucosa]
D. Serosa, longitudinal muscles, sub-mucosa, mucosa

Q.23 Secretion which lacks enzymes is:
A. Saliva
B. Pancreatic juice
[✓ C. Bile]
D. Gastric juice

Q.24 Lactase breaks the lactose into:
A. Fatty acids + glycerols
B. Amino acid + peptones
C. Glucose monomers
[✓ D. Glucose + galactose]

Q.25 Release of $NaHCO_3$ and many enzymes required for intestinal digestion is related with:
[✓ A. Pancreas]
B. Mouth
C. Gallbladder
D. Liver

Q.26 Final digestion of food stuff and absorption of digested products occur at:

[✓ A. Small intestine]

B. Large intestine

C. Mouth

D. Stomach

Q.27 The acidic dietary contents of the stomach, on reaching small intestine are neutralized by _______, produced by _______.

A. Bicarbonate, liver

B. Hydrogen, duodenum

C. Bicarbonate, duodenum

[✓ D. Bicarbonate, pancreas]

Q.28 The hepatic portal vein is located between the:

A. Hepatic vein – vena cava

B. Mouth – stomach

C. Pancreas – small intestine

[✓ D. Small intestine – liver]

Q.29 Hepatic and pancreatic secretions are also stimulated by a hormone called:

A. Gastrin

[✓ B. Secretin]

C. HCl

D. Enterokinase

Q.30 Which of the following carries lipoproteins from digestive tract?

A. Hepatic portal vein

B. Mesenteric vein

[✓ C. Lymphatic vessels]

D. Hepatic vein

Q.31 Which of the following is produced from both intestinal lining and pancreas?

A. Maltase

[✓ B. Lipase]

C. Enterokinase

D. Erypsin

Q.32 Which of the following is not a component of pancreatic juice?

A. $NaHCO_3$

[✓ B. Amino peptidase]

C. Chymotrypsinogen

D. Amylopsin

Q.33 Fats changes to lipoproteins in:

A. Goblet cells

B. Blood vessel

[✓ C. Lacteals]

D. Crypts

Q.34 These are the part of lymphatic system:

[✓ A. Lacteals]

B. Duodenum

C. Villi

D. Liver

Q.35 Starch is digested in:

A. Oral cavity and stomach

[✓ C. Duodenum and ileum]

B. Buccal cavity and duodenum

D. Esophagus and proximal part of small intestine only

Q.36 Which of the following is incorrect regarding to trypsin and pepsin?

A. Both released as pro-enzymes

B. Both are endo-peptidase

C. Both act upon same substrate

[✓ D. Both act on same site and pH]

Q.37 Which one of the following is endocrine pair present in digestive canal?

A. Esophagus and Stomach

B. Pancreas and Ileum

[✓ C. Stomach and Duodenum]

D. Stomach and Liver

Q.38 Which of the following do not pass from the small intestine to the large intestine?

A. Water and sloughed off mucosal cells

B. Cellulose and inactive enzymes

C. Organic and inorganic salts

[✓ D. Gastrin and secretin]

Q.39 Small intestine is termed small because of its small:

A. Surface area

B. Volume

[✓ C. Diameter]

D. Length

Q.40 All principal components of food can be digested by:
A. Gastric juice
B. Pancreatic juice
C. Bile
D. Oral secretions

Q.41 Which of the following statement regarding liver is incorrect?
A. It produces no digestive enzyme
B. Detoxify chemicals and drugs
C. Filters blood
D. Produces albumin and prothrombin

Q.42 Which of the following is not a component of intestinal juice?
A. Ptyalin
B. Lipase
C. Erypsin
D. Lactase

Q.43 Fats pass into blood via:
A. Right lymphatic duct
B. Subclavian vein
C. Thoracic lymphatic duct
D. Jugular vein

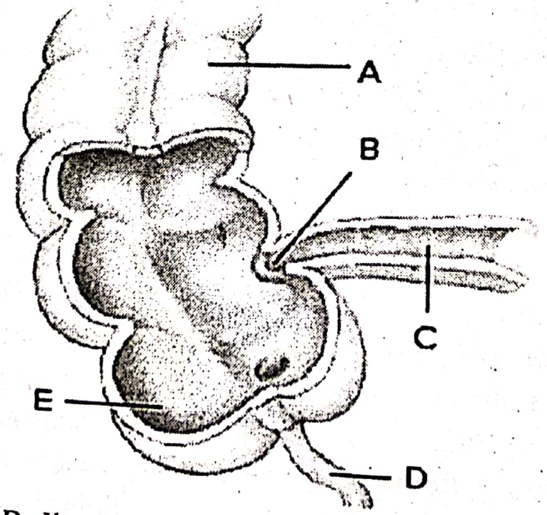
Q.44 In large intestine vitamin K is formed by the activity of:
A. Symbiotic bacteria
B. Obligate parasite
C. Parasitic bacteria
D. Facultative bacteria

Q.45 The longest part of large intestine is:
A. Caecum
B. Rectum
C. Colon
D. Anus

Q.46 The large intestine in human:
A. Digests all type of food
B. Is the longest part of GIT
C. Absorbs H_2O + electrolytes
D. Is connected to stomach

Q.47 Movement of materials across ileum to large intestine is guarded by:
A. Pyloric sphincter
B. Ileocolic sphincter
C. Cardiac asphincter
D. Anal sphincter

Q.48 Find out correct labeling:



A. A- Ascending colon, B- Ileocaecal valve, C- Ileum, D- Appendix, E- Caecum
B. A- Rectum, B- Ileocaecal valve, C- Appendix, D- Small intestine, E- Colon
C. A- Transverse colon, B- Ileocaecal valve, C- Jejunum, D- Ileum, E- Caecum
D. A- Colon, B- Ileocaecal valve, C- Appendix, D- Ileum, E- Rectum

PAST PAPER MCQs

Q.49 Gastric glands are composed of __________ types of cells. **(MDCAT 2014)**
A. Two
B. Four
[✓ C. Three]
D. Five

Q.50 Mucus secreting goblet cells are present in: **(KMDC 2014)**
A. Larynx
B. Glottis
C. Epiglottis
[✓ D. Trachea]

Q.51 HCl in gastric juice is secreted by which one of the following cells? **(MDCAT 2014)**
A. Chief cells
B. Mucous cells
[✓ C. Oxyntic cells]
D. Kupffer cells

Q.52 In human, Escherichia coli is involved in the formation of: **(MDCAT 2014)**
A. Calcium
B. Vitamin A
C. Vitamin D
[✓ D. Vitamin K]

Q.53 Oxyntic cells in stomach produces: **(MDCAT 2015)**
A. Pepsin
B. Gastrin
C. Pepsinogen
[✓ D. HCl]

Q.54 The hormone which increase the secretion of pancreatic juice is: **(MDCAT 2015)**
[✓ A. Secretin]
B. Thyroxine
C. Gastrin
D. Parathormone

Q.55 Trypsinogen is activated to trypsin by: **(MDCAT 2015)**
A. HCl
B. Mucus
[✓ C. Enterokinase]
D. Gastrin

Q.56 The emulsification of fats is the role of: **(MDCAT 2015)**
A. Saliva
B. Gastrin
C. Pancreatic juice
[✓ D. Bile]

Q.57 Protein components of food are digested by the enzymatic secretion of: **(MDCAT 2016)**
A. Goblet Cells
[✓ B. Zymogen Cells]
C. Parietal Cells
D. Oxyntic Cells

Q.58 Digestive System consists of different layers, the innermost is known as: **(MDCAT 2016)**
A. Submucosa
B. Muscularis
[✓ C. Mucosa]
D. Serosa

Q.59 Food enters from stomach into small intestine through: **(MDCAT 2016)**
[✓ A. Pyloric Sphincter]
B. Semilunar valve
C. Cardiac Sphincter
D. Diaphragm

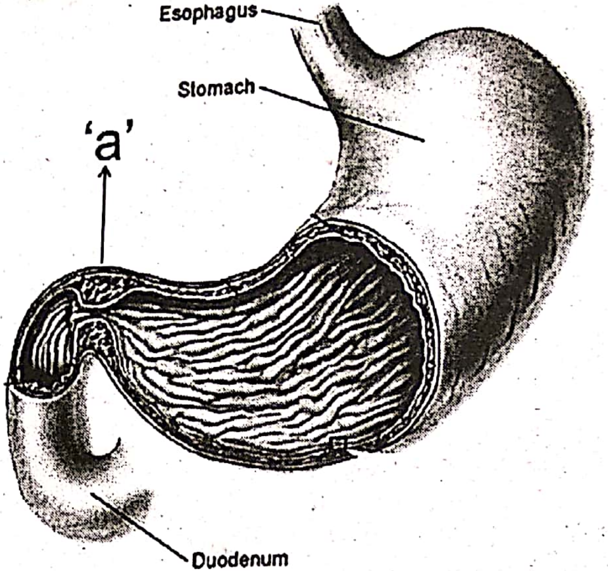
Q.60 __________ are the part of a gastric gland which produce hydrochloric acid. **(MDCAT 2016)**
[✓ A. Parietal Cells]
B. Chief Cells
C. Goblet Cells
D. Zymogen Cells

Q.61 Digestion of __________ starts in oral cavity due to the action of enzyme present in saliva. **(MDCAT 2016)**
[✓ A. Starch]
B. Fatty Acids
C. Cellulose
D. Polypeptides

Q.62 Food is diverted in the oesophagous by: **(MDCAT 2017)**
A. Glottis
B. Cheeks
C. Tongue
[✓ D. Epiglottis]

(MDCAT 2017)

Q.63 **Label 'a' in the following diagram:**



A. Cardiac sphincter
B. Stomach valve
C. Sino atrial valve
[✓ D. Pyloric sphincter]

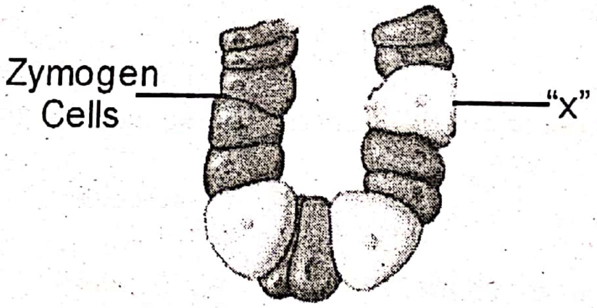
(MDCAT 2017)

Q.64 **Enzyme pepsin acts on:**

Option	Substrate	Product
[✓ A.]	Proteins	Polypeptides
C.	Polypeptide	Dipeptides
B.	Fats	Fatty acids / glycerol
D.	Proteins	Amino acids

Q.65 **Following is the structure of gastric glands in stomach wall where 'x' is:**

(MDCAT 2017)



A. Mucosa
B. Visceral fat cells
C. Mucus cells
[✓ D. Oxyntic cells]

Q.66 **Salivary amylase begins to digest starch to shorter polysaccharides and then to:**

(MDCAT 2017)

A. Sucrose
[✓ B. Maltose]
C. Glucose
D. Lactose

Q.67 **Type of salivary glands found in human oral cavity:**

(MDCAT 2017)

[✓ A. 3]
B. 6
C. 4
D. 2

Q.68 **Which of the following cells secrete HCl?**

(MDCAT 2017)

[✓ A. Oxyntic cells]
B. G Cells
C. Zymogen cells
D. Mucous cells

Q.69 **All kind of absorption take place in:** **(MDCAT 2017)**
A. Duodenum
B. Ileum
C. Jejunum
D. Colon

Q.70 **Appendix is finger like process arise from:** **(MDCAT 2017)**
A. Colon
B. Caecum
C. Rectum
D. Small intestine

Q.71 **The first part of the large intestine is:** **(MDCAT 2018)**
A. Caecum
B. Colon
C. Rectum
D. Appendix

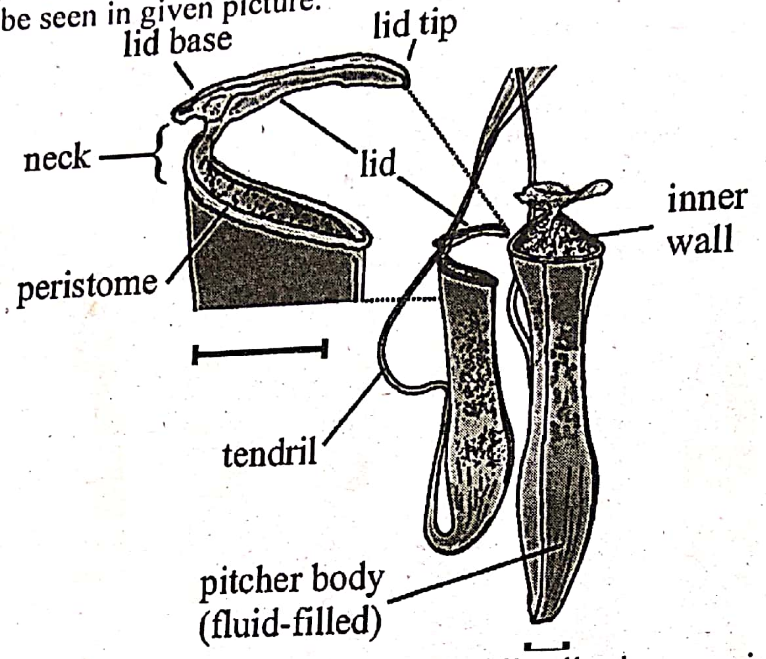
ANSWER KEY

1	B	11	D	21	C	31	B	41	A	51	C	61	A	71	A
2	A	12	B	22	C	32	B	42	C	52	D	62	D		
3	A	13	B	23	C	33	C	43	A	53	D	63	D		
4	A	14	C	24	D	34	A	44	A	54	A	64	A		
5	C	15	A	25	A	35	C	45	C	55	C	65	D		
6	A	16	C	26	A	36	D	46	C	56	D	66	B		
7	A	17	A	27	D	37	C	47	B	57	B	67	A		
8	D	18	A	28	D	38	D	48	A	58	C	68	A		
9	A	19	A	29	B	39	C	49	C	59	A	69	B		
10	C	20	A	30	C	40	B	50	D	60	A	70	B		

EXPLANATORY NOTES

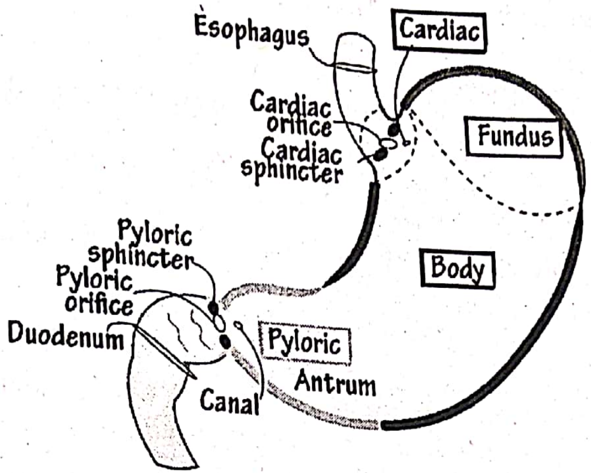
NUTRITION

1. Insectivorous plants are both autotrophs and heterotrophs as they can photosynthesize but the soil in which they grow is nitrogen deficient.so they capture insects for obtaining nitrogen.
2. *Sarracenia purpurea*, commonly known as the purple pitcher plant and its leaves form hood as can be seen in given picture.

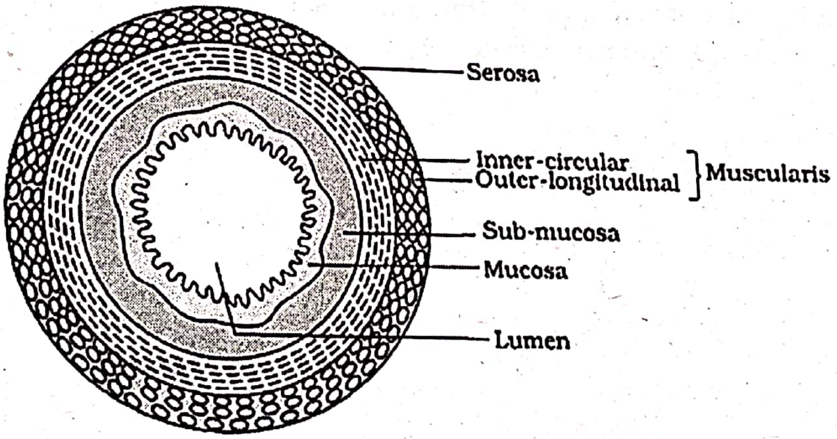


3. Dodder is an annual seed-bearing parasitic vine while all others are insectivorous plants.
4. Amylase is an enzyme while other three are hormones.
5. Those animals which have tubular type digestive system are more complex as compared to sac like digestive system. Tube have two openings.
6. Mastication increases the surface area of food particles which provides site of action for enzymes and significantly improves the digestibility.
7. Oral cavity has amylase enzyme and intestine has amylopsin, lactase and maltase for complete digestion of carbohydrates.
8. Bolus is a partially digested food material by amylase in oral cavity which produces maltose that is disaccharide.
9. Oral cavity, stomach and small intestine are the main sites of digestion.
10. Smell, taste and sight helps for selection of food. Sound is not related to food selection
11. 1-Selection of food, 2-Mastication, 3-Lubrication, 4-Enzymetic digestion of food (starch) will occur in oral cavity.
12. $NaHCO_3$ is bicarbonate which neutralizes the pH in acidic environment.
13. Peristalsis is related to circular and longitudinal muscles of alimentary canal.
14. Human digestive tract starts from oral cavity and ends at anus. Food in digestive tract move downward with the help of peristaltic movements.
15. Esophagus is a muscular tubule which start peristalsis in alimentary canal and secrete no enzyme.
16. High protein in food stimulates the release of gastrin which acts on epithelial cells to increase the secretion of stomach.

17.

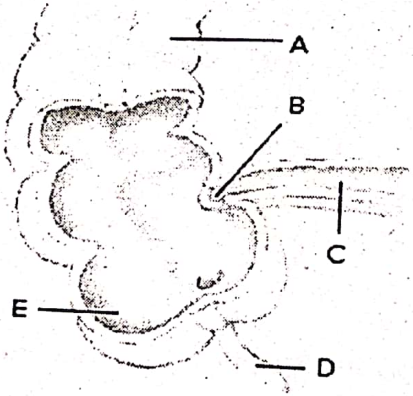


18. Rennin is an enzyme in new born for colostrum digestion. Renin is an enzyme released from stomach.
19. As the middle layer is made up of smooth muscles which contract and relax and generate peristalsis which is responsible for contraction and relaxation.
20. Pepsin is an active enzyme which convert proteins into polypeptides and peptones in stomach.
21. Oral cavity is the site of digestion of starch. So protein, cellulose and fats are not digested.
22.



23. All secretions have enzymes except bile. It is involved in mechanical digestion on fat which is called emulsification.
24. Lactose is composed of glucose and galactose; lactase is enzyme that breaks lactose.
25. Pancreas provides set of enzymes and $NaHCO_3$ for digestion of carbohydrates, proteins and fats. Liver has no enzymatic secretion.
26. Small intestine has duodenum, jejunum and ileum for complete digestion and absorption due to their secretions and large surface area.
27. Pancreas has $NaHCO_3$ which neutralizes the acidic content of food and liver has bile salts for emulsification.
28. The vein that pours blood from liver to circulatory system is hepatic vein whereas hepatic portal vein pours blood from digestive system to liver.
29. When acidic chyme touches the lining of duodenum wall it stimulates the secretion of hormone secretin to stimulate hepatic and pancreatic secretion and inhibit gastric secretion.

30. In intestine, villi have lacteals which absorb fat and carry lipoprotein as chylomicrons.
31. Lipase is an enzyme for lipid digestion which is secreted from pancreas and intestinal lining of small intestine.
32. Small intestine secretes aminopeptidase enzyme.
33. Protein present in lymph combines with fats absorbed from digestive system through lacteals.
34. Lacteals are present in villi to absorb and transport fats to the blood in the form of lipoprotein.
35. Amylase and amylopsin are present in buccal cavity and duodenum respectively for starch digestion.
36. Pepsin is present in stomach and works in acidic pH while trypsin is present in intestine and works in alkaline pH.
37. Stomach and duodenum secrete hormones and act as endocrine glands.
38. Gastrin and secretin are the hormones which are secreted into the blood and not passes to large intestine as fecal material.
39. Small intestine has smaller diameter as compared to large intestine.
40. Pancreas has complete set of enzymes for digestion of all principal components of food.
41. Liver is a metabolic station and has a lot of enzymes for metabolism.
42. Ptyalin is present in oral cavity for starch digestion.
43. Thoracic lymphatic duct is the main duct which transfer lipoproteins into blood.
44. In large intestine *E. coli* produce vitamin K and live as symbionts.
45. Large intestine has colon in the form of ascending, transverse, descending colon.
46. Large intestine provides site for absorption of water and electrolytes.
47. Ileocolic sphincter allows materials to pass from ileum to large intestine.
48.



A=Ascending colon, B=ileocecal sphincter, C=ileum, D=appendix, E=caecum. See above answer

PAST PAPER MCQs

49. These glands are composed of three major cell types: zymogenic, parietal, and mucous cells.
50. Goblet cells are mucous secreting unicellular structures, present in respiratory system and digestive system except stomach.
51. Parietal cells within the stomach lining secrete hydrochloric acid that lowers the pH of the stomach.
52. In large intestine vitamin k is formed by the activity of a symbiotic bacteria like *E. coli*.
53. Parietal cells (Oxyntic cells) within the stomach lining secrete hydrochloric acid that lowers the pH of the stomach.

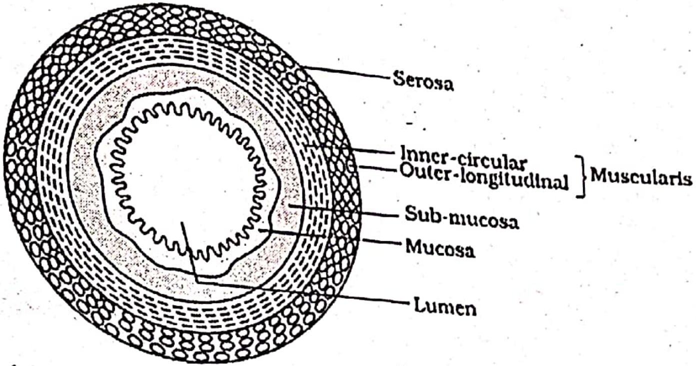
54. Secretin is a hormone released into the bloodstream by the duodenum (especially in response to acidity) to controls secretion by the liver and pancreas.

55. Enterokinase is an enzyme produced by cells of the duodenum and is involved in digestion in humans and other animals.it converts trypsinogen into its active form trypsin, resulting in the subsequent activation of pancreatic digestive enzymes.

56. When bile enters the small intestine, it will mix with the fat globules and will cause them to break down into smaller units called emulsion droplets. This process is called emulsification. Emulsification greatly increases the surface area of the fat on which the lipase can actually act on.

57. Zymogenic (chief) cells, which are thought to produce the enzymes pepsin and rennin. (Pepsin digests proteins, and rennin curdles milk.)

58.



59. The pyloric sphincter is a small piece of smooth visceral muscle that acts as a valve and regulates the flow of partially digested food from the stomach to the duodenum.

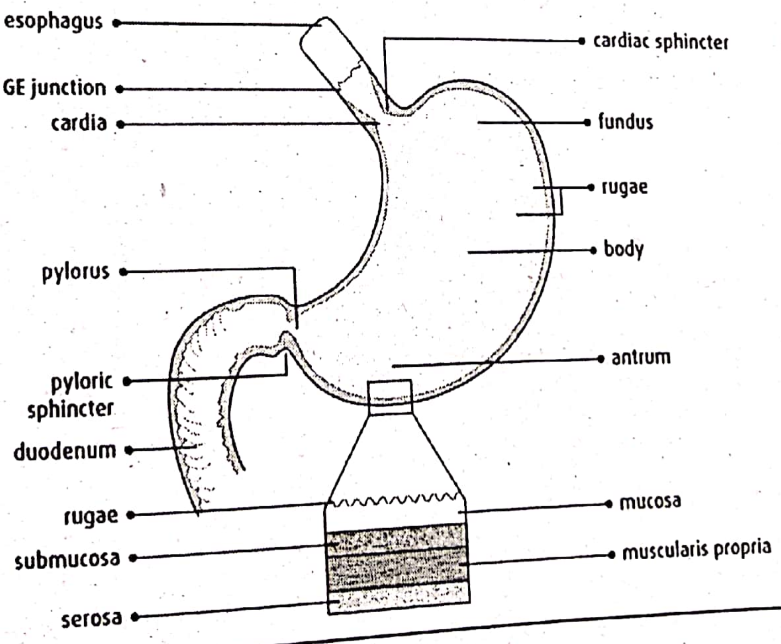
60. Parietal cells (Oxyntic cells) within the stomach lining secrete hydrochloric acid that lowers the pH of the stomach.

61. The main function of amylases is to hydrolyze the glycosidic bonds in starch molecules with in oral cavity, converting complex carbohydrates to simple sugars.

62. The epiglottis is a leaf-shaped flap in the throat that prevents food from entering the windpipe and the lungs.

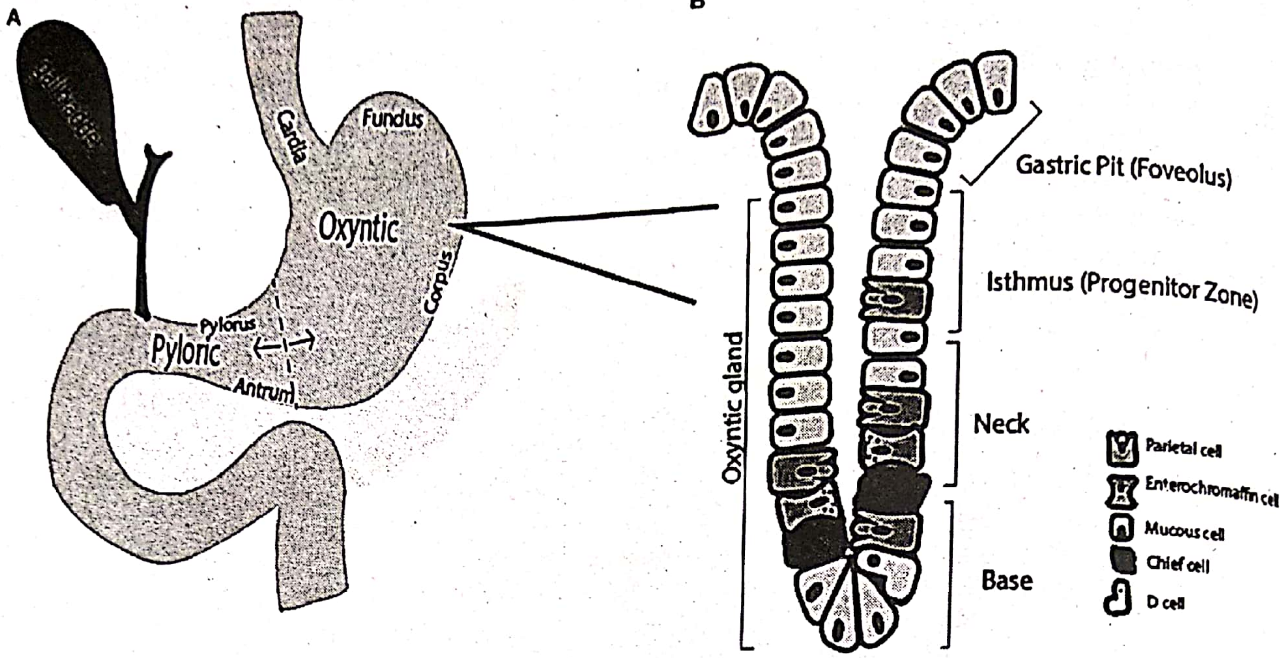
63.

The Stomach



64. Pepsin is a stomach enzyme that serves to digest proteins found in ingested food.

65.



66. Salivary amylase begins to digest starch to shorter polysaccharides and then to maltose

67. Human oral cavity have three types of salivary glands;
  - i. Parotid gland
  - ii. Submaxillary or submandibular gland
  - iii. Sublingual gland

68. Parietal cells (Oxyntic cells) within the stomach lining secrete hydrochloric acid that lowers the pH of the stomach.

69. All kind of absorption take place in Ileum

70. The appendix (vermiform appendix) also cecal appendixor is a finger-like, blind-ended tube connected to the cecum.

71. The first part of the large intestine is Caecum.

GASEOUS EXCHANGE

Q.1 All of the following are lined with mucous membrane of ciliated epithelium except:
A. Nasal cavity
B. Trachea
C. Bronchi
[✓ D. Bronchioles]

Q.2 Which of the following function is not associated with nasal cavity?
A. Filtration
[✓ B. pH adjustment]
C. Moistening
D. Temperature adjustment

Q.3 A complex cartilaginous structure surrounding the upper end of the trachea:
[✓ A. Larynx]
B. Esophagus
C. Pharynx
D. Epiglottis

Q.4 A muscularly controlled cartilage, hinge-like action and serves as a lid which automatically covers the opening of the larynx is called:
[✓ A. Epiglottis]
B. Esophageal sphincter
C. Uvula
D. Respiratory valve

Q.5 Opening from nose to throat is closed by:
A. Epiglottis
B. Esophageal sphincter
[✓ C. Soft palate]
D. Tongue

Q.6 A cavity bounded by ribs and diaphragm is called:
A. Abdominal cavity
[✓ B. Thoracic cavity]
C. Pelvic cavity
D. Pleural cavity

Q.7 Bronchioles are cartilage less tubules having largest diameter of:
[✓ A. 1mm]
B. 0.1mm
C. 1μm
D. 1nm

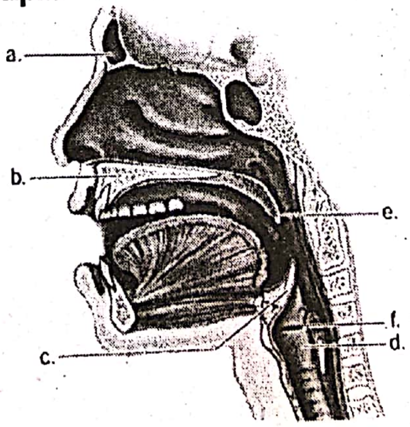
Q.8 Bronchioles are made up of mainly:
A. Connective tissues
B. Goblet cells
[✓ C. Circular smooth muscles]
D. Endothelial cells

Q.9 Functional units of lungs are:
A. Alveoli
B. Bronchioles
[✓ C. Air sacs]
D. Epithelial cells

Q.10 Each air sac consists of several microscopic alveoli which are:
A. Double layered structures
[✓ B. Single layered structures]
C. Triple layered structures
D. Multi layered structures

Q.11 A sheet of skeletal muscles forming the floor of chest cavity is called:
A. Pleura
B. Peritoneum
[✓ C. Diaphragm]
D. Serosa

Q.12 All of the following correctly explain the role of labeled structure in given figure except:



A. d: Voice box
B. e: obstruct entry of food into nasal cavity
[✓ C. f: Common opening for food and air]
D. c: Separates respiratory and digestive tract

Q.13 The function of nasal cavity is:
A. Protection
B. Moisten
C. Temperature regulation
[✓ D. All A, B and C]

Q.14 The epithelium of alveoli is:
A. Ciliated epithelium
[✓ B. Squamous epithelium]
C. Cuboidal epithelium
D. Columnar epithelium

Q.15 How many functional pairs of vocal cords are present in humans?
A. 1
B. 3
[✓ C. 2]
D. 4

Q.16 Trachea lies________ to the esophagus.
A. Dorsal
B. Medial
[✓ C. Ventral]
D. Lateral

Q.17 ________ are folds of tissue within the larynx, creates sounds when vibrate.
[✓ A. Vocal cords]
B. Epiglottis
C. Glottis
D. Trachea

Q.18 The respiratory bronchioles terminate in elongated airways called:
A. Alveolar sacs
B. Bronchi
[✓ C. Alveolar duct]
D. Alveoli

Q.19 Cartilage rings present in trachea which prevent it from collapsing and keep the air passage way open, are:
A. "O" shaped
[✓ B. "C" shaped]
C. "D" shaped
D. "G" shaped

Q.20 Vocal cords are stretched across:
[✓ A. Larynx]
B. Glottis
C. Pharynx
D. Bronchi

Q.21 The chemical nature of surfactant is:
A. Glycolipids
B. Nucleoproteins
C. Glycoproteins
[✓ D. Lipoproteins]

Q.22 In humans, the respiratory center is:
A. Cerebrum
[✓ B. Medulla oblongata]
C. Pons
D. Midbrain

Q.23 Surfactant is present in:
A. Bronchi
[✓ B. Alveoli]
C. Bronchioles
D. Trachea

Q.24 Which of the following is not a function of surfactants?
[✓ A. Filtration of blood]
B. Increase gases exchange
C. Reduce surface tension
D. Act as antiseptic

Q.25 During exercise, the breathing rate may rise to:
A. 15 times per minute
B. 20 times per minute
[✓ C. 30 times per minute]
D. 25 times per minute

Q.26 Which energy is consumed in breathing?
[✓ A. Chemical]
B. Physical
C. Potential
D. Mechanical

Q.27 Find out the incorrect statement:
A. Inspired air contains more O_2 than exhaled air
C. Amount of N_2 is equal in both inhaled and exhaled air
B. Expired air has 100 times greater CO_2 as inspired air
[✓ D. Exhaled air is comparatively dried than inhaled air]

Q.28 Breathing is a mechanical process consisting of:
[✓ A. 2 phases]
B. 4 phases
C. 3 phases
D. 5 phases

Q.29 During inspiration fresh air moves in, which has high percentage of:
A. CO
B. O_2
[✓ C. N_2]
D. CO_2

Q.30 Partial pressure of oxygen is maximum in:
[✓ A. Inspired air]
B. Alveolar air
C. Expired air
D. Oxygenated blood

Q.31 Which of the following play passive role during breathing?
[✓ A. Lungs]
B. Intercostal muscles
C. Diaphragm
D. Pleura

Q.32 Which of the following factors does not alter the rate of breathing by influencing the chemoreceptors in medulla oblongata, aorta and carotid artery?
A. CO_2 partial pressures in the blood
B. H^+ concentration in the blood
C. O_2 partial pressures in the blood
[✓ D. Blood glucose level]

Q.33 If you hold your breath for a long time, CO_2 levels are likely to ______, and the pH of body fluids is likely to ______.
[✓ A. Increase, decrease]
B. Increase, increase
C. Decrease, Increase
D. Decrease, decrease

Q.34 During expiration, the diaphragm becomes:
A. Less dome-shaped
B. Oblique
C. Flattened
[✓ D. More dome-shaped]

Q.35 During inspiration, the diaphragm:
A. Contracts and relax
[✓ B. Contracts and goes downward]
C. Relax and rises
D. Relax and goes downward

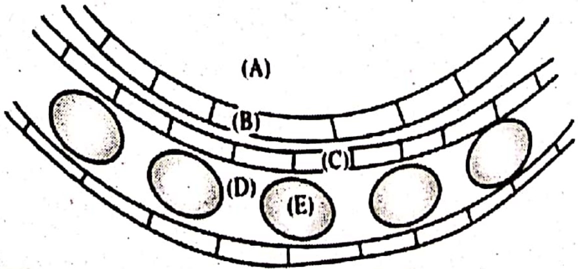
Q.36 Diffusion of respiratory gases is inversely proportional to:
A. Surface area
[✓ B. Thickness of the membrane]
C. Difference in concentration
D. Presence of moisture

Q.37 At normal alveolar ventilation, the respiratory center is stimulated by:
A. O_2 concentration in venous blood
[✓ B. CO_2 concentration in venous blood]
C. CO_2 concentration in arterial blood
D. O_2 concentration in arterial blood

Q.38 Which one of these shows the path of blood after it leave the lungs?
[✓ A. Pulmonary Vein – Left Atrium – Left Ventricle – Aorta]
C. Pulmonary Artery – Left Atrium – Left Ventricle – Aorta
B. Pulmonary Vein – Right Atrium – Right Ventricle – Aorta
D. Pulmonary Artery – Right Atrium – Right Ventricle – Aorta

Q.39 Which of the following correctly describes the binding affinities of gases with haemoglobin?
[✓ A. $CO>CO_2>O_2$]
B. $CO_2>O_2>CO$
C. $O_2>CO_2>CO>$
D. $O_2>CO_2>CO$

Q.40 Just after inhalation, the highest partial pressure of oxygen will be in:



A. B and C
[✓ B. Only A]
C. D and E
D. Only E

Q.41 All of the following occurs due to presence of carbon dioxide in blood except:
A. Increases rate of breathing
[✓ B. Increases respiratory volume]
C. Makes blood more acidic
D. Oxygen carrying capacity of Hb decrease

Q.42 Most of the CO_2 in the blood is carried as/by:
A. Hemoglobin
[✓ B. Bicarbonate ions]
C. Dissolved form
D. Bound to plasma proteins

Q.43 The amount of CO_2 in pulmonary artery is:
A. 54ml/100ml of blood
[✓ B. 50ml/100ml of blood]
C. 60ml/100ml of blood
D. 4ml/100ml of blood

Q.44 Which of the following incorrectly explains the binding of inorganic component in structures found in erythrocytes?
[✓ A. CO with organic portion of haem]
B. CO_2 with NH_2 group of haemoglobin
C. O_2 with Fe^{++} of haem
D. H^+ with COOH group of haemoglobin

Q.45 Which of the following shows maximum solubility in blood plasma?
A. Oxygen
[✓ B. Carbon dioxide]
C. Nitrogen
D. Carbon monoxide

Q.46 Amount of oxygen absorbed by haemoglobin at 115mmHg per 100 ml of blood is:
A. 20 ml
B. 16 ml
C. 13.4 ml
[✓ D. 19.6ml]

Q.47 Which of the following is false regarding to haemoglobin?
A. It is a globular protein
C. Abundantly found in RBC's
B. It contains organic haem group and inorganic Fe^{++}
[✓ D. Each haem in haemoglobin can bind to four O_2 molecules]

Q.48 All of the following can bind to haemoglobin except:
[✓ A. HCO_3^-]
B. O_2
C. H^+
D. CO_2

Q.49 O_2 pressure in cells or tissues is:
A. 158mmHg
B. Less than 100mmHg
C. 115mmHg
[✓ D. Less than 60mmHg]

Q.50 The oxygen content of fresh air is about:
[✓ A. 200 ml/lit]
B. 400 ml/lit
C. 300 ml/lit
D. 500 ml/lit

Q.51 All of the following facilitates the release of O_2 from haemoglobin except:
A. High CO_2 concentration
[✓ B. High pH]
C. High temperature
D. High Acidity

Q.52 In reduced form, hemoglobin carries:
A. CO_2
B. O_2
[✓ C. Hydrogen ion]
D. CO

Q.53 Which of the following has maximum oxygen carrying capacity?
[✓ A. Haemoglobin in erythrocytes]
B. Globulin in blood plasma
C. Myoglobin in sarcoplasm
D. Bicarbonate ions in RBCs

Q.54 The binding capacity of haemoglobin is greater than myoglobin by:
A. 80%
[✓ B. 75%]
C. 90%
D. 100%

Q.55 The characteristics red color of hemoglobin is due to:
[✓ A. Haem]
B. β–globin chains
C. α–globin chains
D. Central iron atom

Q.56 What is true about haemoglobin?
A. It is dipeptide and present in RBC
C. It is present in dissolved state in blood plasma
B. It is dipeptide in mammals and localized in RBC
[✓ D. It is having haem group]

Q.57 Tidal volume of lungs is:
A. 5 liter
[✓ B. 0.5 liter]
C. 1.5 liter
D. 3500 ml

Q.58 The residual volume is:
A. 5 liter
[✓ B. 1.5 liter]
C. 500 ml
D. 3500 ml

Q.59 All are respiratory disorders except:
A. Pulmonary tuberculosis
B. Emphysema
[✓ C. Rickets]
D. Lungs Cancer

Q.60 In heavy smokers, the alveoli become enlarged and damaged which reduces the surface area for the exchange of respiratory gases. This condition is called:
A. Lung cancer
[✓ B. Emphysema]
C. Asthma
D. Bronchitis

PAST PAPER MCQs

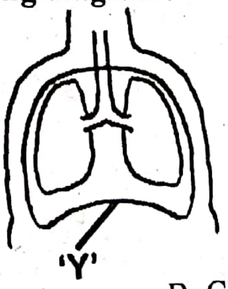
Q.61 About 70-85% CO_2 in blood is carried: (MDCAT 2015)
A. As carboxylase myoglobin
B. Freely as CO_2
C. With proteins in plasma
[✓ D. As bicarbonate]

Q.62 Breathing consists of: (MDCAT 2016)
A. Four phases
B. One phase
C. Three phases
[✓ D. Two phases]

Q.63 Carboxyhaemoglobin (10-20%) is formed when CO_2 combines with: (MDCAT 2016)
[✓ A. Amino group of haemoglobin]
B. Haem portion of haemoglobin
C. Iron part of haemoglobin
D. Plasma proteins

Q.64 Respiratory tubules are termed as bronchioles when they attain the diameter of ____________ or lesser. (MDCAT 2017)
A. 1.2cm
[✓ B. 1mm]
C. 1cm
D. 1.2mm

Q.65 Label the part 'Y' in the following diagram: (MDCAT 2017)



A. Pleura
B. Chest cavity
[✓ C. Diaphragm]
D. Inter-coastal muscle

Q.66 Low partial pressure of oxygen in tissues favors ________ of oxyhaemoglobin. (MDCAT 2017)
A. Dissociation
B. Stability
C. Formation
D. Transformation

Q.67 Which of the following is a respiratory disorder related to malnutrition?(MDCAT 2017)
A. Cancer
B. Emphysema
C. Asthma
D. Tuberculosis

Q.68 Site of gaseous exchange in humans is: (MDCAT 2017)
A. Trachea
B. Bronchus
C. Alveoli
D. Nose

Q.69 Gaseous exchange in animals takes place with the help of process called as: (MDCAT 2017)
A. Active transport
B. Cyclosis
C. Phagocytosis
D. Diffusion

Q.70 Breakdown of thin wall of alveoli occurs in: (MDCAT 2017)
A. Emphysema
B. T.B
C. Cancer
D. Asthma

Q.71 During breathing air from pharynx enters to: (MDCAT 2018)
A. Alveoli
B. Bronchi
C. Bronchioles
D. Trachea

Q.72 Which of the following statement is correct about the respiratory pigments? (MDCAT 2018)
A. Albumin, globulin and globular proteins are present in respiratory pigments
C. Myoglobin and haemoglobin has higher affinity for nitrogen
B. Myoglobin has more affinity for oxygen as compared to haemoglobin
D. Cyanide and haemoglobin has low affinity for oxygen

Q.73 Gradual breakdown of the alveolar wall leads to which type of disease in a smoker? (MDCAT 2018)
A. Asthma
B. Coronary heart disease
C. Bronchitis
D. Emphysema

Q.74 The low levels of surfactant produced by alveolar epithelium causes: (MDCAT 2018)
A. Emphysema
B. Respiratory distress syndrome
C. Bronchitis
D. Asthma

Q.75 During inspiration the space inside the chest cavity is increases due to:(MDCAT 2019)
A. Increased pressure
C. The relaxation of the muscle of the diaphragm
B. Relaxation of the external intercostal muscle
D. The contraction of the muscles of the diaphragm

Q.76 A disease caused by gradual breakdown of the thin walls of alveoli is ________. (MDCAT 2019)
A. Tuberculosis
B. Emphysema
C. Asthma
D. Bronchitis

Q.77 In the passageways of the respiratory system mucus secreting cells called:(NTS 2019)
A. Tracheal cells
B. Goblet cells
C. Surfactant cells
D. Pleural cells

Q.78 Function of respiratory passage, Celia is to keep the airways clear of:
A. CO_2
B. O_2
C. Dust
D. CO

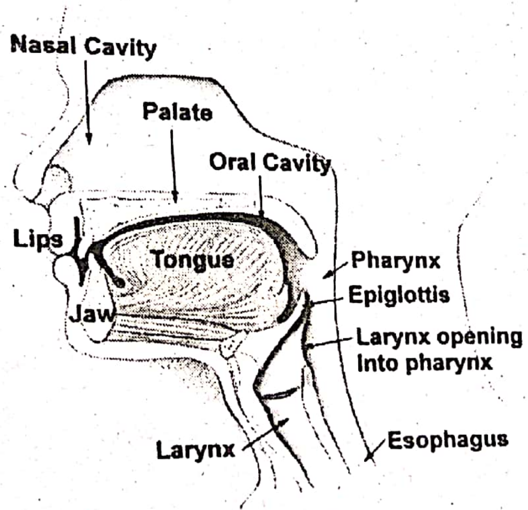
ANSWER KEY

1	D	16	C	31	A	46	D	61	D	76	B
2	B	17	A	32	D	47	D	62	D	77	B
3	A	18	C	33	A	48	A	63	A	78	C
4	A	19	B	34	D	49	D	64	B		
5	C	20	A	35	B	50	A	65	C		
6	B	21	D	36	B	51	B	66	A		
7	A	22	B	37	B	52	C	67	D		
8	C	23	B	38	A	53	A	68	C		
9	C	24	A	39	A	54	B	69	D		
10	B	25	C	40	B	55	A	70	A		
11	C	26	A	41	B	56	D	71	D		
12	C	27	D	42	B	57	B	72	B		
13	D	28	A	43	B	58	B	73	D		
14	B	29	C	44	A	59	C	74	B		
15	C	30	A	45	B	60	B	75	D		

EXPLANATORY NOTES

GASEOUS EXCHANGE

1. Ciliated epithelium containing goblet cells is absent in bronchioles.
2. Air while passing through the nasal cavity becomes warm, moist and filtered of smaller foreign particles by mucous membrane.
3. Larynx is also known as voice box and has vocal cards for sound production. It is made up of complex cartilaginous structure surrounding the upper end of the trachea.
4.



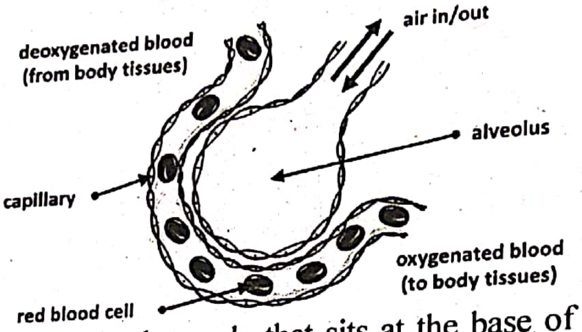
5. During swallowing backward movement of tongue pushes the soft palate up and closes the nasal opening at the back.
6. Chamber of the body of vertebrates that is protected by the rib cage is called thoracic cavity.

7. When the diameter of bronchi becomes 1mm or less and it is devoid of cartilage is named as bronchioles.

8. Bronchioles have circular smooth muscles. Cartilage and ciliated epithelium are absent in bronchioles.

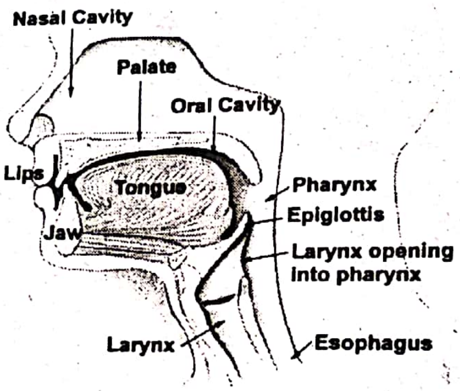
9. Air sac is the functional unit of the lungs. Air sac consists of several microscopic single layered structures called alveoli.

10.



11. The diaphragm is a thin skeletal muscle that sits at the base of the chest and separates the abdomen from the chest. It contracts and flattens when you inhale. This creates a vacuum effect that pulls air into the lungs.

12. Pharynx (throat) is common for digestion and respiration.

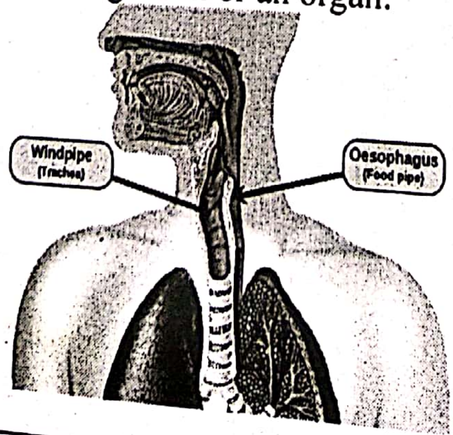


13. Air while passing through the nasal cavity becomes warm, moist and filtered of smaller foreign particles by mucous membrane.

14. Epithelium of alveoli is squamous or flattened epithelial cells, very thin and irregular in outline, occur as the covering epithelium of the alveoli of the lung.

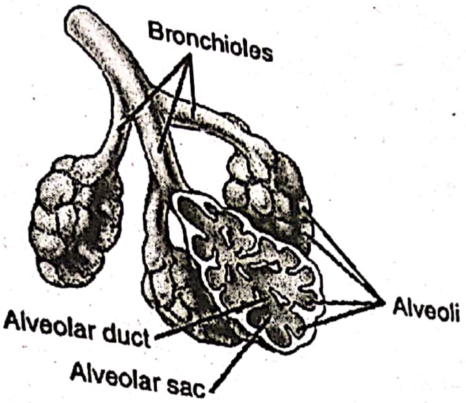
15. In the glottis, the mucous membrane is stretched across into two thin edged fibrous bands called vocal cords, which help in sound production.

16. Ventral is the underside of an organism or an organ.



17. In the glottis, the mucous membrane is stretched across into two thin edged fibrous bands called vocal cords, which help in sound production.

18.



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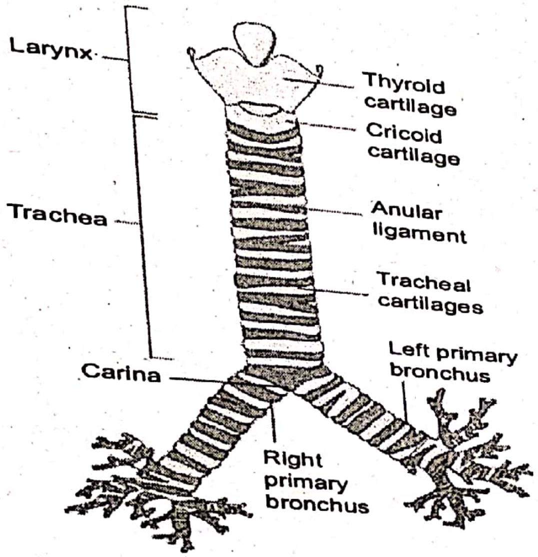
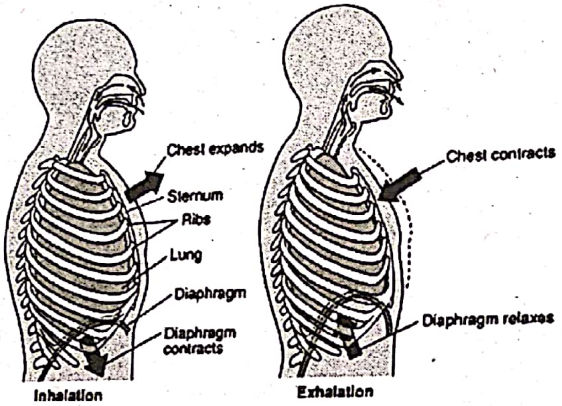
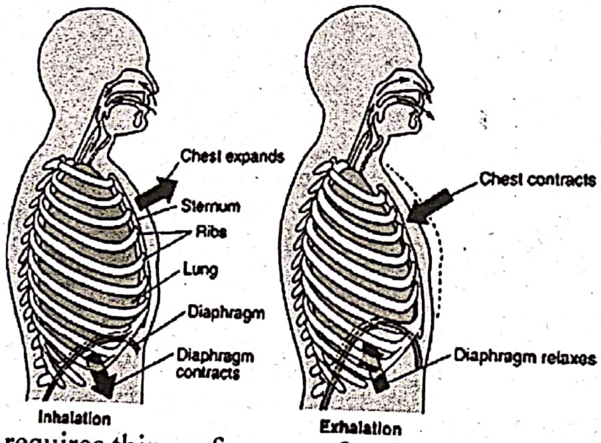


20. In the glottis (upper end of larynx) the mucous membrane is stretched across into two thin edged fibrous bands called vocal cords, which help in sound production.
21. Surfactants are compounds that lower the surface tension (or interfacial tension) between two liquids, between a gas and a liquid, or between a liquid and a solid. Surfactants may act as detergents, wetting agents, emulsifiers, foaming agents, and dispersants.
22. Involuntary breathing is controlled by medulla oblongata.
23. Surfactant (the mixture of lipoproteins) is produced by the secretory cells of the alveolar epithelium.
24. Surfactants is a lipoprotein layer inside alveoli, which reduce surface tension between water molecules to increase gases exchange. It never involve infiltration of blood.
25. At rest, we inhale and exhale 15-20 times per minute. During exercise, the breathing rate may rise to 30 times per minute.
26. Over all process of breathing is active and consumes energy during inspiration in the form of ATP.
27. Exhaled air has saturated water contents as compared to inhaled air which has variable water contents.

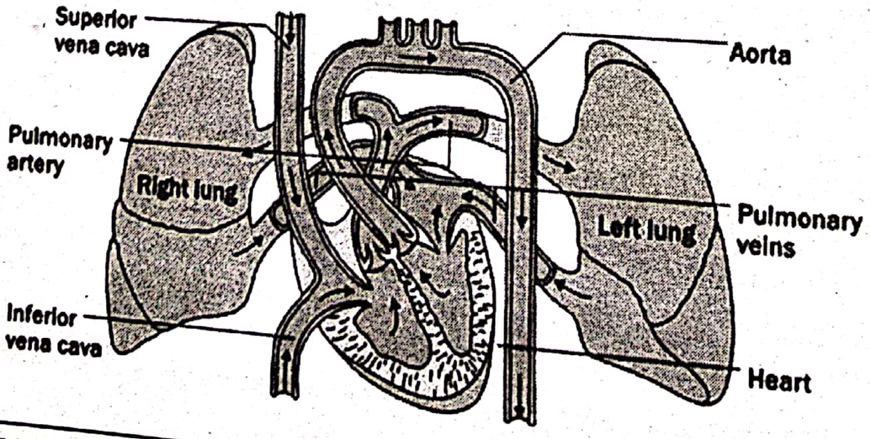
28. Breathing is mechanical process consisting of two phases i.e., inspiration and expiration.
29. Highest concentration in inhaled air and exhaled air is that of N_2, that is 79%.
30. Oxygen is 21% in inhaled air and it is 16% in exhaled air.
31. Lungs neither pull air in nor can they push it out. During inspiration passive expansion of elastic lungs occurs and expiration is due to passive contraction of lungs.
32. CO_2, O_2, pH and temperature are the factors responsible to affect the capacity of haemoglobin to combine with oxygen.
33. If we hold our breath for long time, then due to increased metabolic activity CO_2 level will be increased and pH will also be decreased.
34.



35.



36. Gaseous exchange requires thin surface area for the gases to be diffused.
37. Carbon dioxide is much more important than oxygen as a regulator of normal alveolar ventilation.
38.



39. The affinity of CO with haemoglobin is more than that of CO_2; similarly, the affinity of CO_2 with haemoglobin is more than O_2.
40. Partial pressure of oxygen is more in alveoli than blood vessels surrounding alveoli.
41. Level of carbon dioxide in the blood is stimulus for breathing. More carbon dioxide in the blood will lead to the carbonic acid formation and so more will be the H^+ ions concentration due leads to decrease in oxygen carrying capacity of haemoglobin.
42. About 70% of CO_2 is carried as bicarbonate ions.
43. Venus blood contains 4% more CO_2 per 100ml (54ml/100ml) of blood as compared to arterial blood (50ml/100ml).
44. Binding site of CO and O_2 with haemoglobin is common that is Fe^{++} of haem.
45. Carbon dioxide is more soluble in blood than is oxygen; about 5 to 7 percent of all carbon dioxide is dissolved in the plasma.
46. When oxygen tension is 115mmHg mercury, haemoglobin is 98% saturated and therefore contains 19.6ml of oxygen per 100ml of blood.
47. Haemoglobin has four polypeptide chains; each chain has one haem group which can bind with single oxygen molecule.
48. 70% of carbon dioxide is transported in the form of $NaHCO_3$. CO_2 combines with amine group of haemoglobin.
49. During cellular respiration, oxygen is used and carbon dioxide is produced, due to the consumption of oxygen there is least partial pressure of oxygen at tissue level.
50. Approximately there is 20% oxygen in the air (20ml/100ml or 200ml/1000ml).
51. More CO_2, less O_2, high temperature and less pH facilitate oxygen dissociation from oxyhaemoglobin.
52. Addition of H^+ ions or electrons is known as reduction. Reduced form of haemoglobin contains H^+.
53. 90% of cytoplasm of erythrocytes is occupied by haemoglobin. Each molecule of haemoglobin carries four oxygen molecules.
54. Each molecule of haemoglobin four oxygen molecules but each molecule of myoglobin contains one oxygen molecule. Because haemoglobin has four polypeptide chains while myoglobin has one polypeptide chain.
55. The actual colour of RBCs is red and it is due to the presence of iron in the haem group of haemoglobin.
56. Haemoglobin has four polypeptide chains containing protein.
57. Tidal volume is the amount of air that moves in or out of the lungs with each respiratory cycle. It measures around 500 mL in an average healthy adult.
58. Residual volume is the volume of air remaining in the lungs after maximum forceful expiration. Its value is between 1400 and 1600 ml.
59. Rickets is the softening and weakening of bones in children, usually because of an extreme and prolonged vitamin D deficiency.
60. Emphysema is a lung condition that causes shortness of breath. In people with emphysema, the air sacs in the lungs (alveoli) are damaged. Over time, the inner walls of the air sacs are weakened and ruptured creating larger air spaces instead of many small ones.

PAST PAPER MCQs

61. About 70% of CO_2 is transported as bicarbonate ions.
62. Breathing is mechanical process consisting of two phases i.e., inspiration and expiration.
63. About 70% CO_2 is transported in the form of bicarbonate ions and about 20% is transported as carboxyhaemoglobin. Carboxyhaemoglobin is formed when carbon dioxide combines with amine group of haemoglobin.
64. When the diameter of bronchi becomes 1mm or less and it is devoid of cartilage is named as bronchioles.
65. Floor of chest cavity is known as diaphragm.
66. More CO_2, less O_2, high temperature and less pH facilitate oxygen dissociation from oxyhemoglobin.
67. Malnutrition and poor living conditions facilitate *Mycobacterium* to grow.
68. Air sac is the functional unit of the lungs. Air sac consists of several microscopic single layered structures called alveoli. Gaseous exchange occurs at alveoli.
69. Gaseous exchange is always a passive process in which gases move from higher concentration to lower concentration.
70. Emphysema is a lung condition that causes shortness of breath. In people with emphysema, the air sacs in the lungs (alveoli) are damaged. Over time, the inner walls of the air sacs are weakened and ruptured creating larger air spaces instead of many small ones.
71. Pharynx is common of digestion and respiration. Air from pharynx moves to trachea and food is pushed to esophagus.
72. Myoglobin stores oxygen in muscles. It is also known as muscle haemoglobin. It has more affinity for oxygen as compared to haemoglobin, so for this reason it is not a good oxygen carrier.
73. Emphysema is a lung condition that causes shortness of breath. In people with emphysema, the air sacs in the lungs (alveoli) are damaged. Over time, the inner walls of the air sacs are weakened and ruptured creating larger air spaces instead of many small ones.
74. Respiratory distress syndrome is common, and it occurs because enough surfactant is not produced by secretory cells of the alveolar epithelium.
75. During inspiration muscles of ribs and diaphragm contract due to which ribs are elevated and diaphragm becomes less dome shape. The space in chest cavity is increased.
76. Emphysema is a lung condition that causes shortness of breath. In people with emphysema, the air sacs in the lungs (alveoli) are damaged. Over time, the inner walls of the air sacs are weakened and ruptured creating larger air spaces instead of many small ones.
77. Goblet cells are unicellular structures which present in respiratory system and secrete mucus.
78. Tiny hairs called cilia protect the nasal passageways and other parts of the respiratory tract, filtering out dust and other particles that enter the nose through the breathed air.

TRANSPORT

Q.1 Active transport is selective and is dependent upon:
A. Photosynthesis
[✓ B. Respiration]
C. Transportation
D. Permeability

Q.2 The site/s where most of the uptake of water and minerals take place is/are:
[✓ A. Root hairs]
B. Root cells
C. Underground stem
D. Leaves

Q.3 The roots bear a dense cluster of tiny hair like structures which are extensions of:
A. Mesodermal cells
[✓ B. Epidermal cells]
C. Endodermal cells
D. Epithelial cells

Q.4 Apoplast pathway can take water and minerals up to:
A. Xylem
B. Cortex
[✓ C. Endodermis]
D. Pericycle

Q.5 The membrane of vacuoles is known as:
A. Cisternae
[✓ B. Tonoplast]
C. Cristae
D. Protoplast

Q.6 Transport of minerals from soil to epidermal cells of roots via carrier protein molecules along their concentration gradient is called:
A. Diffusion
[✓ B. Facilitated diffusion]
C. Passive transport
D. Active transport

Q.7 The pathway adopted by water in plants through adjacent cell walls is:
[✓ A. Apoplast pathway]
B. Symplast pathway
C. Vacuolar pathway
D. Tonoplast pathway

Q.8 In plants, the neighboring cells are connected with one another by:
[✓ A. Plasmodesmata]
B. Cell walls
C. Vacuoles
D. Casparian strips

Q.9 In the root cells________ pathway becomes discontinuous in the endodermis due to the presence of casparian strip.
A. Tonoplast
[✓ B. Apoplast]
C. Symplast
D. Vacuolar

Q.10 The water potential of pure water is:
[✓ A. Zero]
B. One
C. Infinity
D. Negative

Q.11 To attain maximum turgidity of a cell, it must be placed in:
A. Normal saline
[✓ B. Distilled water]
C. Glucose solution
D. Away from sunlight

Q.12 In an __________ solution, solute and pressure potentials is equal to water potential.
A Hyperplasmonic
[✓ B. Isotonic]
C. Hypertonic
D. Hypotonic

Q.13 Chordae tendinea are extension of:
A. Heart
[✓ B. Ventricles]
C. Auricles
D. Sinus venosus

Q.14 Which one has the thickest walls than the others?
A. Right atria
B. Left atria
C. Right ventricle
[✓ D. Left ventricle]

Q.15 The nature of valves in the heart is:
A. Membranous
[✓ B. Muscular]
C. Tendinous
D. Ligamentous

Q.16 Oxygenated blood is supplied to all body parts from:
A. Right atrium
B. Left atrium
C. Right ventricle
D. Left ventricle

Q.17 Mitral valve prevents the flow of blood from:
A. Right atrium to right ventricles
B. Left atrium to left ventricles
C. Right atrium to left atrium
D. Left ventricles to left atrium

Q.18 First artery that arises from the base of aorta:
A. Pulmonary artery
B. Coronary artery
C. Renal artery
D. Iliac arteries

Q.19 At start of ventricular contraction:
A. Bi and tricuspid valves are opened
B. Semilunar valves are closed
C. Bi and tricuspid valve are opened and semilunar valve are closed
D. Bi and tricuspid valves closed and semilunar valves are opened

Q.20 Ventricle depolarization is represented by:
A. P wave
B. QRS complex
C. T wave
D. PQRS complex

Q.21 The most appropriate statement for atrial systole is:
A. A.V valves closed
B. A.V valves open
C. A.V valves open and semilunar valves closed
D. A.V valves closed and semilunar valves open

Q.22 At the end of ventricle contraction:
A. A.V valves open
B. Semilunar valves open
C. A.V valves open and semilunar valves are closed
D. Both A.V and semilunar valves are closed

Q.23 Lubb sound is produced when:
A. A.V valves open
B. Semilunar valve close
C. A.V valves close
D. Semilunar valve open

Q.24 Heart cycle is naturally initiated by:
A. S.A node
B. A.V node
C. Battery
D. Henson node

Q.25 Atrial depolarization is represented by:
A. P wave
B. QRS Complex
C. T wave
D. PQRS

Q.26 All events of cardiac cycle are completed in:
A. 0.8 sec
B. 0.3 sec
C. 0.15 sec
D. 0.4 sec

Q.27 The portion of heart which is always ready to be the pacemaker if SA node stop working:
A. Bundle branch
B. AV node
C. Ventricle Muscles
D. Atrial Muscles

Q.28 Which valve allows blood to pass from heart to pulmonary artery?
A. Right Semi lunar valve
B. Left AV valve
C. Left Semi lunar valve
D. Right AV valve

Q.29 Myocardium of heart shows ______ characters.
A. Smooth and involuntary
B. Smooth and voluntary
[✓ C. Striated and involuntary]
D. Striated and voluntary

Q.30 Ventricular systole requires about:
A. 1 sec
B. 0.8 sec
C. 0.1 sec
[✓ D. 0.3 sec]

Q.31 The waves of ECG shows mainly:
A. Blood pressure
[✓ B. Electrical Events]
C. Mechanical Events
D. Chemical Events

Q.32 The second heart sound is produced by:
A. Closure of AV valves
B. Opening of AV valves
[✓ C. Closure of Semilunar valves]
D. Opening of Semilunar valves

Q.33 In humans, only ______ systemic arch is present.
[✓ A. Left]
B. Superior
C. Right
D. Inferior

Q.34 The heart muscle is nourished by:
A. Chambers of the heart
B. Right atrium
[✓ C. Coronary artery]
D. Left atrium

Q.35 Which one is continuation of iliac artery?
A. Renal Artery
[✓ B. Femoral Artery]
C. Hepatic Artery
D. Intercostal Arteries

Q.36 Which vein has oxygenated blood?
A. Renal vein
[✓ B. Pulmonary vein]
C. Subclavian vein
D. Jugular vein

Q.37 In man, blood from alimentary canal to liver is transported by:
[✓ A. Hepatic portal vein]
B. Hepatic vein
C. Pulmonary vein
D. Renal vein

Q.38 Arteriosclerosis is:
A. A metabolic disorder
[✓ B. A degenerative disorder]
C. An infectious disorder
D. A genetic disorder

Q.39 All are functions of lymphatic system except:
A. Transport fat
B. Provide immunity
C. Blood filtration
[✓ D. Filtration of urea]

Q.40 Lymph is not present in:
A. Lacteal
B. Lymph node
C. Left thoracic lymphatic duct
[✓ D. Left subclavian vein]

Q.41 Which one is more closely related to lymph?
A. CSF
[✓ B. Interstitial fluid]
C. Blood
D. Urine

Q.42 Lymph nodes are drained by:
A. Single afferent vessel
[✓ B. Single efferent vessel]
C. Many afferent vessels
D. Many efferent vessels

Q.43 Largest lymphoid mass is:
A. Thymus
[✓ B. Spleen]
C. Adenoid
D. Tonsils

Q.44 Flow of lymph is maintained by:
A. Skeletal muscles
B. Visceral movements
C. Breathing movements
[✓ D. All A, B, C]

Q.45 Just as blood is filtered by spleen, the lymph is filtered by:
A. Spleen
[✓ B. Lymph nodes]
C. Tonsils
D. Liver

Q.46 Lymph just before entering into subclavian vein always passes through:
A. Heart
B. Abdominal vessels
C. Groin lymph nodes
[✓ D. Thoracic lymphatic duct]

Q.47 Return of lymph from lower leg is assisted by:
A. Lymph nodes
B. Venous valves
[✓ C. Calf muscles]
D. Cytokines

Q.48 After taking too much fat, the lymph consists of how many fat globules?
A. 10%
[✓ B. 1%]
C. 20%
D. 8%

Q.49 Common feature of cell humoral response and cell mediated response are:
[✓ A. Recognition of antigen]
B. Tissue rejection
C. Production of antibodies
D. Plasma clone formation

Q.50 Tissue rejection is the function of which type of response?
[✓ A. Cell mediated]
B. Cell humoral
C. Cell signaling
D. Cell to cell

Q.51 Vaccination against specific disease like tetanus is an example of:
[✓ A. Artificial active immunity]
B. Natural active immunity
C. Artificial passive immunity
D. Natural passive immunity

Q.52 Antibodies are injected in:
A. Artificial active immunity
B. Natural active immunity
[✓ C. Artificial passive immunity]
D. Natural passive immunity

Q.53 Antibodies consist of:
A. One Heavy chain only
B. Two heavy chains only
[✓ C. Two heavy and two light chain only]
D. Two light chains only

Q.54 Antibodies are an example of ______________ protein.
A. Fibrous
[✓ B. Globular]
C. Catalytic
D. Regulatory

Q.55 Antigen binding sites are present on:
A. Constant region of heavy chain only
B. Constant region of light chain only
[✓ C. Variable region of both heavy and light chains]
D. Constant region of both heavy and light chains

Q.56 Any foreign body that may activate immune system:
[✓ A. Antigen]
B. Immunoglobulin
C. Antibodies
D. Plasmogen

Q.57 Immunity is the capacity of body for all except:
A. Recognize antigen
B. Mobilize Lymphocytes
C. Increase antibodies production
[✓ D. Mobilize hemoglobin]

Q.58 Immunity is generally destroyed in:
A. All infections
[✓ B. HIV infection]
C. All inflammations
D. All diseases

Q.59 Specific immunity is the result of:
A. 1st line of defense
[✓ B. 3rd line of defense]
C. 2nd line of defense
D. 4th line of defense

Q.60 Phagocytosis usually involves:
A. 1st line of defense B. 3rd line of defense
[✓ C. 2nd line of defense] D. 4th line of defense

Q.61 All are examples of 1st line of defense except:
A. Skin B. Mucous
C. Stomach HCl [✓ D. Antibodies]

Q.62 Cyclosporine is used to inhibit which type of response?
[✓ A. Cell mediated] B. Cell humoral
C. Cell signaling D. Cell to cell

Q.63 Type of immunity that is present by birth is called:
[✓ A. Innate immunity] B. Adaptive immunity
C. Acquired immunity D. Secondary immunity

Q.64 Generally, vaccination provides:
[✓ A. Artificial active immunity] B. Natural active immunity
C. Artificial passive immunity D. Natural passive immunity

Q.65 All are true about passive immunization except:
A. Antibodies are injected B. Antisera are injected
C. Antitoxin are injected [✓ D. Antibodies are produced]

Q.66 Antibodies consist of:
A. One chain B. Two chains
C. Three chains [✓ D. Four chains]

Q.67 Disulfide bridge is present between all except:
A. Heavy –Heavy chains B. Light and heavy chain
C. Heavy- light chain [✓ D. Light and light chain]

Q.68 Vaccination is not available for which of the following disease:
A. Bacterial [✓ B. Fungal]
C. Viral D. Microbial

Q.69 Stronger and specific immunity is found in:
A. All animals B. Humans only
C. Invertebrates only [✓ D. All vertebrates]

Q.70 An antigen is:
A. Residue of antibody B. Result of antibody
[✓ C. Stimulus for antibody formation] D. Opposite to an antibody

Q.71 A vaccine contains:
[✓ A. Antigens] B. Macrophages
C. Antibodies D. All A, B, C

Q.72 Humoral immune response is generated by:
[✓ A. B lymphocytes] B. Basophils
C. T lymphocytes D. Neutrophils

Q.73 B-lymphocytes originate in human from:
A. Blood cells B. Bursa of fabricious
[✓ C. Bone marrow] D. Thymus

Q.74 Transplant rejection is:
[✓ A. Cell mediated response] B. Immune response
C. Humoral response D. Auto immune response

Q.75 Right atrium is separated from right ventricle by:
[✓ A. Tricuspid valve] B. Semilunar valve
C. Bicuspid valve D. Septum

Q.76 The average life span of red blood cell is about:
[✓ A. Four months]
B. Five months
C. Two months
D. One month

Q.77 Antibodies are produced against invading cells by:
[✓ A. Lymphocytes]
B. Basophils
C. Monocytes
D. Neutrophils

Q.78 The lymphatic vessels of the body empty the lymph into blood stream at the:
A. Abdominal vein
B. Jugular vein
[✓ C. Sub-clavian vein]
D. Bile duct

PAST PAPER MCQs

Q.79 The oxygenated blood from lungs to heart is transported by the: (MDCAT 2014)
A. Pulmonary artery
[✓ B. Pulmonary vein]
C. Coronary artery
D. Hepatic artery

Q.80 Which part of antibody recognizes the antigen during immune response? (MDCAT 2014)
A. Heavy part
B. Constant part
C. Light part
[✓ D. Variable part]

Q.81 Which one of the following glands is involved in the production of lymphocytes? (MDCAT 2014)
A. Pineal
[✓ B. Thymus]
C. Pituitary
D. Adrenal

Q.82 Antibodies are proteins and made up of how many polypeptide chains? (MDCAT 2014)
A. One
B. Three
C. Two
[✓ D. Four]

Q.83 T-lymphocytes recognize antigen and attack microorganisms or transplanted organ and tissues. This effect is called: (MDCAT 2014)
[✓ A. Cell-mediated response]
B. Active immunity
C. Humoral immune response
D. Passive immunity

Q.84 What type of immunity is achieved by injecting antibodies, antiserum, anti-venom serum? (MDCAT 2014)
A. Active immunity
B. Artificially induced immunity
[✓ C. Passive immunity]
D. Naturally induced immunity

Q.85 Lymphocytes function as to: (SMBBMC 2014)
A. Engulf bacteria
B. Produce histamine and heparin
[✓ C. Produce antibodies]
D. Initiate blood clotting

Q.86 Right atrium is separated from right ventricle by: (MDCAT 2015)
A. Bicuspid Valve
[✓ B. Tricuspid Valve]
C. Semilunar Valve
D. Interatrial Septum

Q.87 One complete heart beat consists of one systole and one diastole and lasts for about: (MDCAT 2015)
[✓ A. 0.8 sec]
B. 0.4 sec
C. 0.2 sec
D. 0.5 sec

Q.88 The flaps of tricuspid valves are attached to muscular extensions of right ventricle known as: (MDCAT 2015)
A. Smooth Muscles
B. Intercostal Muscles
[✓ C. Papillary Muscles]
D. Skeletal Muscles

Q.89 The heart beat cycle starts when electric impulses are generated from: (MDCAT 2015)
A. AV Node
[✓ B. SA Node]
C. SV Node
D. PQ Node

Q.90 B-lymphocytes are named due to their relationship with: (MDCAT 2015)
A. Blood
B. Bone Marrow
[✓ C. Bursa of Fabricius]
D. Bile Duct

Q.91 The lymph vessel of villi is called: (MDCAT 2015)
A. Epithelium
B. Adrenals
C. Afferent lymph vessel
[✓ D. Lacteal]

Q.92 In ____________ response, B-cells produce plasma cells that synthesize antibodies and release in blood plasma and tissue fluid. (MDCAT 2015)
A. Cell-Mediated
[✓ B. Humoral]
C. Hormonal
D. Phototactic

Q.93 Response of body against the transplanted organ is: (MDCAT 2015)
A. Homeostatic Response
B. Primary Response
C. Behavioral Response
[✓ D. Cell-mediated Response]

Q.94 Passive immunity is used against: (MDCAT 2015)
A. Malaria
B. Dengue
C. Typhoid
[✓ D. Tetanus]

Q.95 The pancreas is stimulated to secrete its digestive enzymes by: (LUMHS 2015)
A. The liver
B. Bile
C. The gallbladder
[✓ D. Secretin]
E. Insulin

Q.96 About 55% of the volume of human blood is: (SMBBMH 2015)
[✓ A. Plasma]
B. Blood cells
C. Blood Protein
D. A and B

Q.97 In human the closed sac which surrounds the heart is: (MDCAT 2016)
A. Endocardium
[✓ B. Pericardium]
C. Myocardium
D. Epicardium

Q.98 Chordae tendineae are the fibrous cords attached with: (MDCAT 2016)
A. Cardiac end of stomach valve
B. Pyloric sphincter of stomach
[✓ C. Tricuspid valve of heart]
D. Eyelid

Q.99 Bicuspid valve controls the flow of blood from: (MDCAT 2016)
A. Right atrium to right ventricle
B. Left ventricle to aorta
C. Right ventricle to pulmonary artery
[✓ D. Left atrium to left ventricle]

Q.100 In antibody molecule, two heavy and two light chains are bonded by: (MDCAT 2016)
[✓ A. Disulphide Bond]
B. Hydrogen Bond
C. Mono sulphide Bond
D. Ionic Bond

Q.101 Variable amino acid sequences in antibody molecule are found in ________. (MDCAT 2016)
A. Both light chains only
B. One heavy and one light chain
C. Both heavy chains only
[✓ D. Both heavy and light chains]

Q.102 B-cells release antibodies in blood plasma, tissue fluid and lymph. This kind of immune response is called: (MDCAT 2016)
A. Cell Mediated Response
B. Active Response
[✓ C. Humoral Response]
D. Compound Response

Q.103 The type of immunity in which antibodies are passed from one individual to another is called: (MDCAT 2016)
[✓ A. Passive Immunity]
B. Natural Active Immunity
C. Artificial Active Immunity
D. Humoral Immunity

Q.104 To combat the active infections of tetanus, rabies and snakes the _______ method of immunization is used. (MDCAT 2016)
A. Active
B. Active Artificial
C. Humoral
D. Passive

Q.105 In ECG, QRS wave represents: (MDCAT 2017)
A. Ventricular systole
B. Diastole
C. Atrial systole
D. Recovery systole

Q.106 Thoracic lymph duct of the lymphatic system opens into__________. (MDCAT 2017)
A. Superior vena cava
B. Inferior vena cava
C. Sub-clavian vein
D. Renal vein

Q.107 How many polypeptide chains are present in a typical antibody structure? (MDCAT 2017)
A. 1
B. 3
C. 2
D. 4

Q.108 The antibody molecule consists of____________ polypeptide chains. (MDCAT 2017)
A. Eight
B. Six
C. Four
D. Two

Q.109 ________________cells survive for a few days and secrete a huge no of antibodies in blood, tissue fluids or lymph. (MDCAT 2017)
A. Memory cells
B. T-lymphocytes
C. B-lymphocytes
D. Plasma cells

Q.110 The intermediate protection from infection of snake bite can be obtained by: (MDCAT 2017)
A. Active Immunity
B. Passive immunity
C. Natural active immunity
D. Vaccination

Q.111 Vaccination is: (MDCAT 2017)
A. Natural active immunity
B. Artificial active immunity
C. Natural passive immunity
D. Artificial passive immunity

Q.112 Bicuspid valve is present in which part of heart? (MDCAT 2017)
A. Right atrium and right ventricle
B. Left atrium and left ventricle
C. Right atrium and left ventricle
D. Left atrium and right ventricle

Q.113 Cardiac cycle lasts about: (MDCAT 2017)
A. 0.4 sec
B. 0.01 sec
C. 0.8 sec
D. 0.5 sec

Q.114 A part of digestive system that is not contact with food is the: (NTS 2017)
A. Small intestine
B. Stomach
C. Large intestine
D. Liver
E. Trachea

Q.115 All of the following protect the body against a trance of germs except: (NTS 2017)
A. Tears
B. Mucus membrane
C. WBCs
D. Ciliated cells
E. RBCs

Q.116 Humoral immunity is carried by a special group of cells called: (NTS 2017)
A. B-cells
B. Killer cells
C. Null cels
D. T-cells

Q.117 The thickest chamber of human heart is: (MDCAT 2018)
A. Left atrium
B. Right atrium
C. Left ventricle
D. Right ventricle

Q.118 Which one of the following act as a pacemaker in heart? **(MDCAT 2018)**
A. Atria ventricular node
[✓ B. Sino-atrial nod]
C. Atria ventricular bundles of fibers
D. Bundle of His

Q.119 Which statement is correct about atrial systole? **(MDCAT 2018)**
A. Atria relax and ventricles contract
B. Atria contract and ventricle also contract
C. Atria and ventricles are relaxed
[✓ D. Ventricles remain relax while atria contract]

Q.120 In immunoglobulins/antibodies, two light chains and two heavy chains are linked to each other by? **(MDCAT 2018)**
A. Covalent bonds
[✓ B. Disulphide bonds]
C. Hydrogen bonds
D. Ionic bonds

Q.121 Cell mediated immune response is given by: **(MDCAT 2018)**
A. Neutrophils
B. Macrophages
[✓ C. T lymphocytes]
D. B lymphocytes

Q.122 Anti-venom given after a snake bite venom is an example of: **(MDCAT 2018)**
A. Artificial active immunity
[✓ B. Artificial passive immunity]
C. Natural active immunity
D. Natural passive immunity

Q.123 In ECG, QRS complex represent: **(ETEA 2018)**
A. Atrial systole
B. Arial diastole
[✓ C. Ventricle systole]
D. Ventricle diastole

Q.124 Which of the following blood vessels contain semilunar valves? **(MDCAT 2019)**
A. Arteries
B. Arterioles
[✓ C. Veins]
D. Capillaries

Q.125 Large lymph vessels ultimately form larger lymph duct, which drains its lymph into: **(MDCAT 2019)**
A. Carotid and Aorta
[✓ B. Sub-clavian Vein]
C. Sub-clavian artery
D. Vena cava and Aorta

Q.126 Water and minerals move down their concentration gradient through plasmodesmata, to cells of cortex, endodermis, pericycle and then to sap in the xylem cells. This is also known as the: **(MDCAT 2019)**
[✓ A. Symplastic pathway]
B. Vacuolar pathway
C. Mineral absorption pathway
D. Apoplastic pathway

Q.127 Four plants are present in different environmental conditions. Plant A is present in warm climate with continuous rainfall, plant B is present in a cool forest, plant C is present in warm climate with little breeze while plant D is present in warm climate high wind speed. Which one of the above plants will have highest rate of transpiration? **(MDCAT 2019)**
A. Plant B
B. Plant C
[✓ C. Plant D]
D. Plant A

Q.128 Now a day, every new born gets regular shots of vaccine for polio. It contains __________ for polio to make a child immune against this disease. **(MDCAT 2019)**
A. Antisera
B. Antibiotics
C. Antibodies
[✓ D. Antigens]

Q.129 A person got an infection, he became ill but then he survived. What do you think which type of immunity he would have developed? **(MDCAT 2019)**
[✓ A. Naturally induced active immunity]
B. Active immunity
C. Artificially induced active immunity
D. Passive immunity

Q.130 The type of blood cells that have biconcave disc like shape are: **(AJK 2019)**
A. Lymphocytes
B. Platelets
C. Monocytes
[✓ D. Red blood cells]

Q.131 **Purkinje fibers are connected with the impulse conducting system of: (ETEA 2019)**

[✓ A. Heart]
B. Brain
C. Skin
D. Nephron

Q.132 **Regarding structure of human heart chordae tendinous are present in: (PMC 2020)**

A. Atria
B. Renal
C. Pulmonary valve
[✓ D. Ventricle]

Q.133 **The prevention of disease by artificial activation of immune response is possible by: (AJK 2019)**

A. Gene therapy
B. Drugs
[✓ C. Vaccines]
D. Antibodies

Q.134 **The valves controlling the one-way flow of blood from atria to ventricles are: (AJK 2019)**

A. Semilunar valves
B. Sinoatrial valve
[✓ C. Bicuspid and tricuspid valves]
D. Septum

Q.135 **_______ is a foreign substance, which stimulates the formation of antibodies. (AJK 2019)**

A. Antibiotic
[✓ B. Antigen]
C. Archaea
D. Transposon

Q.136 **The only vein in the human body carrying oxygenated blood is: (PMC 2020)**

A. Femoral
B. Renal
[✓ C. Pulmonary]
D. Iliac

Q.137 **The cells which play very important role in developing immunity are: (PMC 2020)**

A. Monocytes
[✓ B. Lymphocytes]
C. Neutrophils
D. Thrombocytes

Q.138 **Which of the following blood vessels have the highest pressure of blood? (PMC 2020)**

[✓ A. Aorta]
B. Pulmonary veins
C. Pulmonary arteries
D. Vena cava

Q.139 **Autoimmune diseases act at the principle of: (PMC 2020)**

A. Self against antigens
[✓ B. Self against self]
C. Antigen against self
D. Antigen self-destroyed

Q.140 **In human heart the left atrium receives: (PMC 2020)**

A. The superior vena cava
B. The coronary sinus
C. The inferior vena cava
[✓ D. The four pulmonary veins]

Q.141 **Antibodies are manufactured in: (PMC 2020)**

A. T lymphocytes
B. Platelets
C. Red blood cells
[✓ D. B lymphocytes]

Q.142 **In roots the apoplast pathway of water is disrupted when water reaches: (PMC 2020)**

A. Plasmodesmata
B. Cortex
[✓ C. Endodermis]
D. Pith

ANSWER KEY

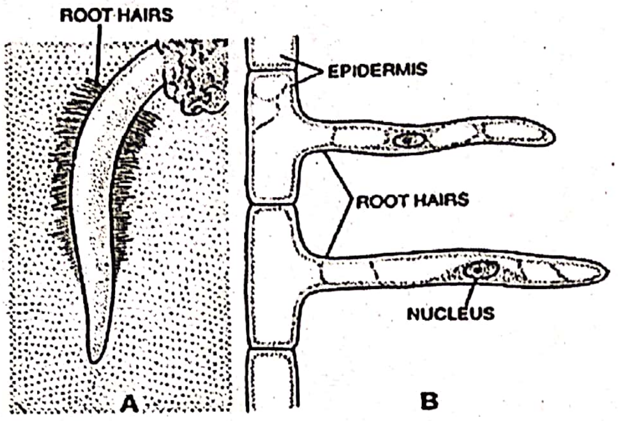
TOPIC-WISE MCQs & PAST PAPER MCQs

1	B	16	D	31	B	46	D	61	D	76	A	91	D	106	C	121	C	136	C
2	A	17	D	32	C	47	C	62	A	77	A	92	B	107	D	122	B	137	B
3	B	18	B	33	A	48	B	63	A	78	C	93	D	108	C	123	C	138	A
4	C	19	D	34	C	49	A	64	A	79	B	94	D	109	D	124	C	139	B
5	B	20	B	35	B	50	A	65	D	80	D	95	D	110	B	125	B	140	D
6	B	21	C	36	B	51	A	66	D	81	B	96	A	111	B	126	A	141	D
7	A	22	D	37	A	52	C	67	D	82	D	97	B	112	B	127	C	142	C
8	A	23	C	38	B	53	C	68	B	83	A	98	C	113	C	128	D		
9	B	24	A	39	D	54	B	69	D	84	C	99	D	114	D	129	A		
10	A	25	A	40	D	55	C	70	C	85	C	100	A	115	E	130	D		
11	B	26	A	41	B	56	A	71	A	86	B	101	D	116	A	131	A		
12	B	27	B	42	B	57	D	72	A	87	A	102	C	117	C	132	D		
13	B	28	A	43	B	58	B	73	C	88	C	103	A	118	B	133	C		
14	D	29	C	44	D	59	B	74	A	89	B	104	D	119	D	134	C		
15	B	30	D	45	B	60	C	75	A	90	C	105	A	120	B	135	B		

EXPLANATORY NOTES

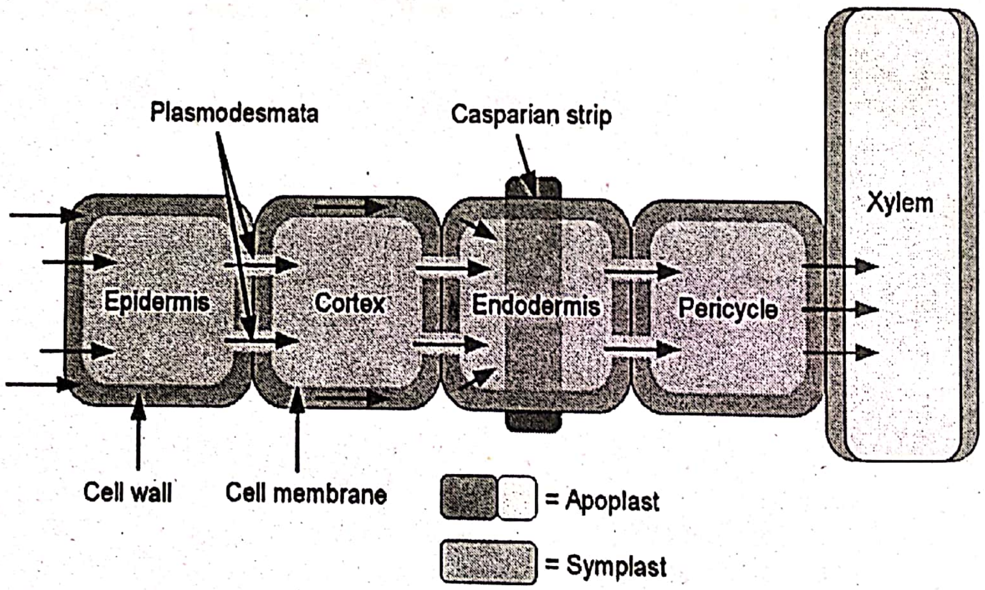
TRANSPORT

1. Active transport is the uphill movement of material by using energy in the form of ATP, which synthesize by the process of cellular respiration.
2. A root hair or the rhizoid of a vascular plant, these are hairs-forming cell on the epidermis of a plant root. As they are lateral extensions of a single cell and only rarely branched, they are visible to the naked eye and developed in maturation region of roots.
3.



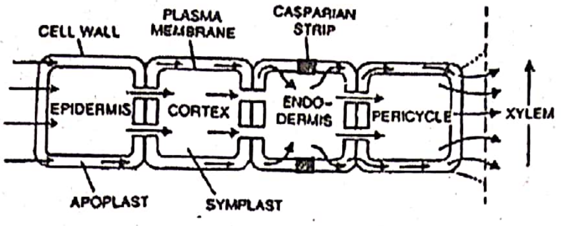
ol hair. A, young seedling of radish with root hairs developing acropetally; B, highly magnified mature root hairs with vacuolated cytoplasm.

4.



5. A vacuole is a membrane-bound organelle (tonoplast). They are a kind of vesicle. Vacuoles are closed sacs, made of membranes with inorganic or organic molecules inside, such as enzymes. Protoplast is cell without cell wall. Cisternae are the structure present in endoplasmic reticulum, while cristae are the inholdings of inner mitochondrial membrane.
6. Facilitated diffusion is the transport of substances across a biological membrane from an area of higher concentration to an area of lower concentration with the help of a transport molecule.

7.



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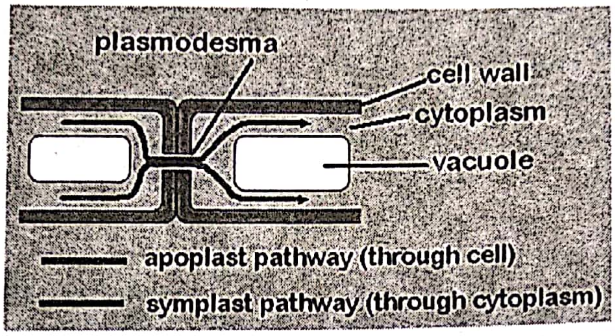
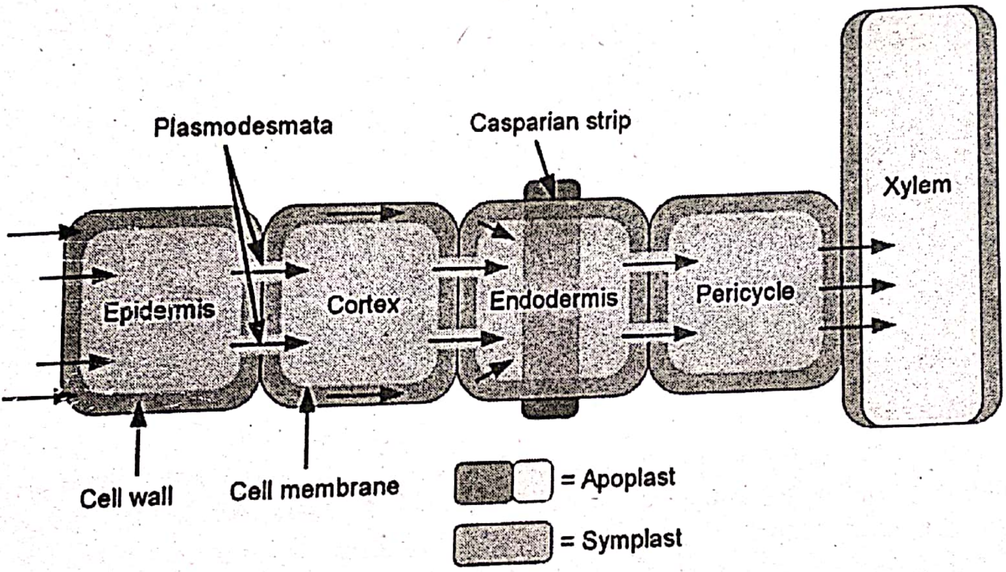

plasmodesma
cell wall
cytoplasm
vacuole
apoplast pathway (through cell)
symplast pathway (through cytoplasm)

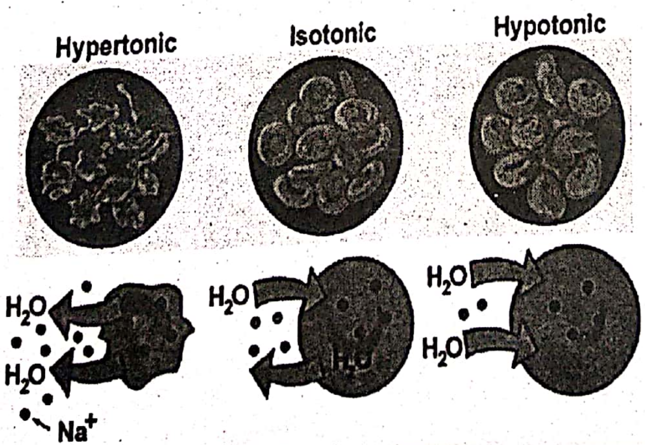
9.



10. Water potential of pure water is zero. Water potential is represented by Ψw.

11. For maximum pressure potential a cell placed in pure water or distilled water due to entry of water inside the cell.

12.



13. These flaps are attached with fibrous cords called chordae tendinea, to the papillary muscles which are extensions of the wall of the ventricles.

14. The wall of left ventricle is thicker (3 times) than that of right ventricle

15. The nature of valves present in the heart is muscular and muscles ensure the unidirectional flow of blood in circulation.

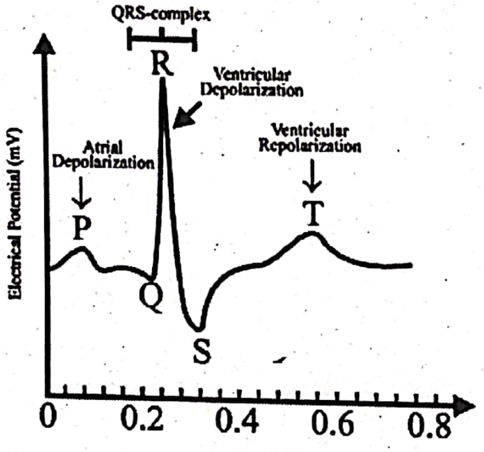
16. The right ventricle pumps deoxygenated blood into the pulmonary circulation for oxygenation and the left ventricle pumps oxygenated blood into the systemic circulation through aorta.

17. Mitral valve is another name used for bicuspid valve and prevents the entry of blood from left ventricle to left atrium.

18. At the base of aorta, first pair of arteries, the coronary arteries arise and supply blood to heart.

19. When ventricle contraction start, atrio-ventricular valve close to prevent back flow of blood and semilunar valve open to move blood out form heart.

20.



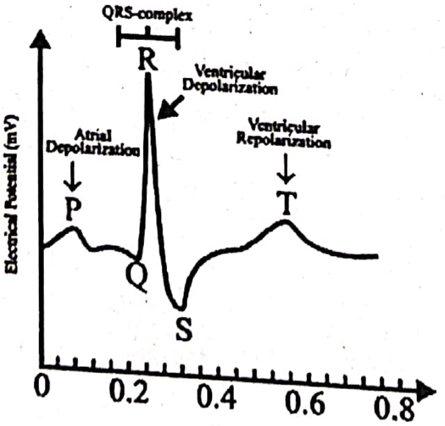
21. During atrial systole, the atrio-ventricular valves remain open while semi-lunar valves remain closed because the pressure gradient between the atrium and ventricle is preserved during late ventricular diastole.

22. At the end of ventricular systole, atrio-ventricular and semilunar valves are closed.

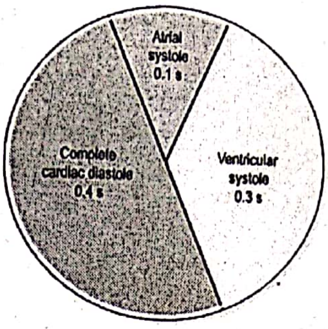
23. In healthy adults, there are two normal heart sounds, often described as a *lubb* and a *dubb*, that occur in sequence with each heartbeat. These are the first heart sound (S_1) and second heart sound (S_2), produced by the closing of the atrio-ventricular valves and semilunar valves, respectively.

24. The SA node is the heart's natural pacemaker. The SA node consists of a cluster of cells that are situated in the upper part of the wall of the right atrium.

25.



26.



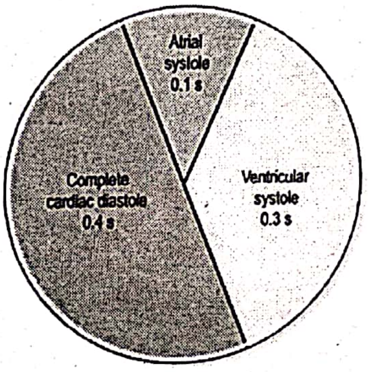
Total period of 1 cycle = 0.8 s

27. The atrioventricular node or AV node is a part of the electrical conduction system of the heart that coordinates the top of the heart. It electrically connects the atria and ventricles.

28. On ventricular contraction blood from right ventricle is pumped into pulmonary trunk and from left ventricle blood is pumped into aorta. To prevent backflow of blood into ventricles there are semilunar valves at the base of aorta and pulmonary trunk.

29. Myocardium of heart has striations which show similarity with skeletal muscles but cardiac muscles are involuntary in action.

30.



Total period of 1 cycle = 0.8 s

31. ECG is a test to check electrical events of heart that determined by the electrodes placing on body.

32. During ventricle contraction two heart sounds produce, 1st sound is "Lub" produce when AV-valves close while the 2nd heart sound is "Dub" which produce when semilunar valves close

33. In humans, only left systemic arch is present.

34. First artery that arises from base of aorta is coronary artery which supplies oxygenated blood to the heart.

35. Descending aorta is bifurcated into two iliac arteries which on further division form femoral artery that supply blood to thigh muscles of legs.

36. The pulmonary vein carries oxygenated blood from the lungs to the left atrium.

37. The hepatic portal vein is a vessel that moves blood from the spleen and gastrointestinal tract to the liver. It is approximately three to four inches in length and is usually formed by the merging of the superior mesenteric and splenic veins behind the upper edge of the head of the pancreas.

38. Arteriosclerosis is a degenerative disorder which is the result of continuous process based on degenerative cellular changes affecting tissues or organs, and will increasingly deteriorate over time.

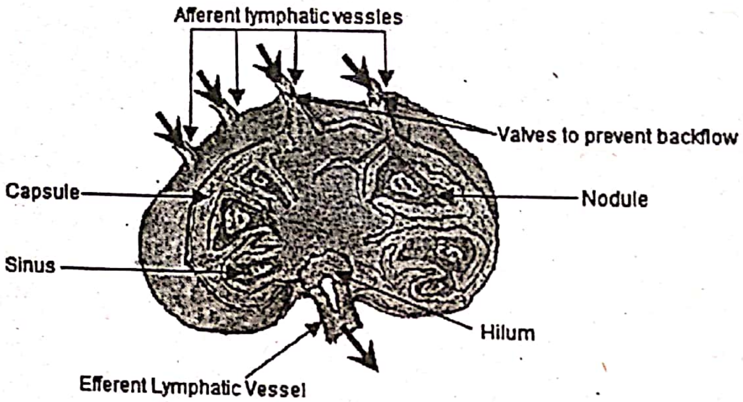
39. Transportation of absorbed lipids from small intestine, filtration of blood by spleen and immunity is related to the lymphatic system while filtration of urea is the function of kidneys.

40. Lymph is extra cellular fluid present in lymph vessels. Subclavian vein is a part of blood circulatory system.

41. The lymph is formed when the interstitial fluid (the fluid which lies in the interstices of all body tissues) is collected through lymph capillaries.

42.

Lymph Node Structure


Afferent lymphatic vessles
Valves to prevent backflow
Capsule
Nodule
Sinus
Hilum
Efferent Lymphatic Vessel

43. The largest lymphoid structure present in the human body is spleen while thymus, adenoid and tonsils are relatively small structures.

44. Lymph flow from body parts is assisted by the movement of viscera, breathing movement and skeletal muscles.

45. Lymph nodes are important for the proper functioning of the immune system, acting as filters for foreign particles and cancer cells. Lymph nodes do not have a detoxification function, which is primarily dealt by liver.

46. The thoracic duct is the largest lymphatic vessel within the human body. Lymph before entering into the blood passes through lymphatic duct.

47. Lymph movement control by the contraction of skeletal muscles, the calf muscles are skeletal muscles in lower limbs that will assist the movement of lymph.

48. After some fatty meal fat globules will form 1% of lymph that return to blood.

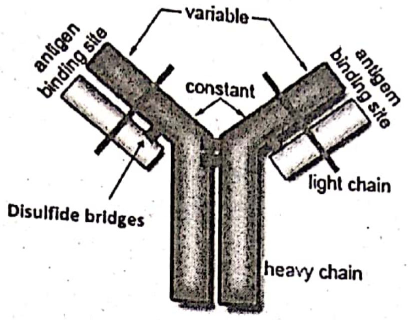
49. Recognition of antigen is important in both types of responses. However, tissue rejection is a cell mediated response, on the other hand production of antibodies and plasma clone formation is achieved by cell humoral response.

50. Transplant rejection occurs when transplanted tissue is rejected by the recipient's cell mediated response, which destroys the transplanted tissue. Transplant rejection can be lessened by determining the molecular similarity between donor and recipient and by use of immunosuppressant drugs after transplant.

51. Tetanus vaccine, also known as tetanus toxoid, is an inactive vaccine used to prevent tetanus. It is considered as artificial active immunity.

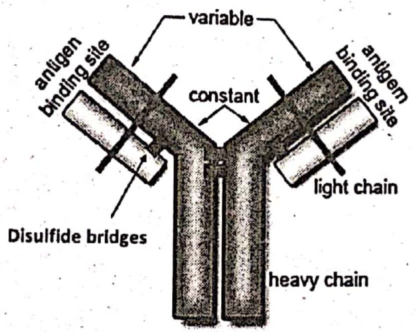
52. Passive immunity can occur naturally, when maternal antibodies are transferred to the fetus through the placenta and it can also be induced artificially, when high levels of antibodies specific to a pathogen or toxin (obtained from humans, horses, or other animals) are injected to affected person.

53. Two light and two heavy chains are visible in given diagram.



54. An antibody (Ab), also known as an immunoglobulin (Ig), is a large, Y-shaped globular protein produced mainly by plasma cells that is used by the immune system to phagocytose the antigens or neutralize their toxins.

55. As we can see antigen binding sites are present on variable region of both heavy and light chains



56. Antigen is a toxin or other foreign substance which induces an immune response in the body, especially the production of antibodies.

57. Hemoglobin mobilization is the function of blood and heart that comes under circulatory system.

58. HIV is dangerous because the virus destroys the cells of *immune* system. HIV replicates within helper T lymphocytes and destroys them.

59. Specific immunity is the result of 3rd line of defense which includes lymphocytes.

60. Phagocytes are type of cell within the body capable of engulfing and absorbing bacteria and other small cells or particles. These are neutrophils and monocytes that form 2nd line of defense.

61. Skin, HCl and mucous are examples of barriers which constitute 1st line of defense while antibodies produced by lymphocytes which belongs to 3rd line of defense.

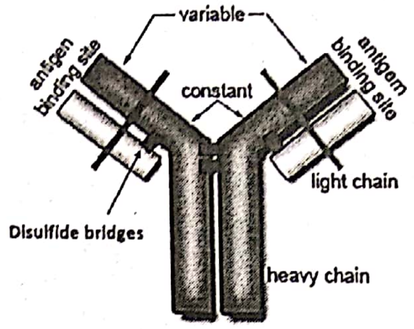
62. *Cyclosporine* is used to prevent organ rejection (cell mediated) in people who have received a liver, kidney, or heart transplant. It is usually taken along with other medications to allow your new organ to function normally. *Cyclosporine* belongs to a class of drugs known as immuno-suppressants.

63. The innate immunity, also known as the non-specific immunity or in-born immunity, is an important subsystem of the overall immune system that comprises the cells and mechanisms that defend the host from infection by other organisms.

64. Artificially acquired active immunity can be induced by a vaccine, (a substance that contains antigen). A vaccine stimulates a primary response against the antigen without causing symptoms of the disease.

65. In passive immunization we inject antibodies in the body; body does not make its own antibodies.

66 and 67.



68. Vaccines have been prepared against different types of bacterial and viral infections, but there is not any vaccine against fungus still discovered.

69. For immunity purpose antibodies or immunoglobulin are produced by all vertebrates which protect them against pathogens.

70. Any foreign substance which induce an immune response in the body of organism especially by producing antibodies is called antigen.

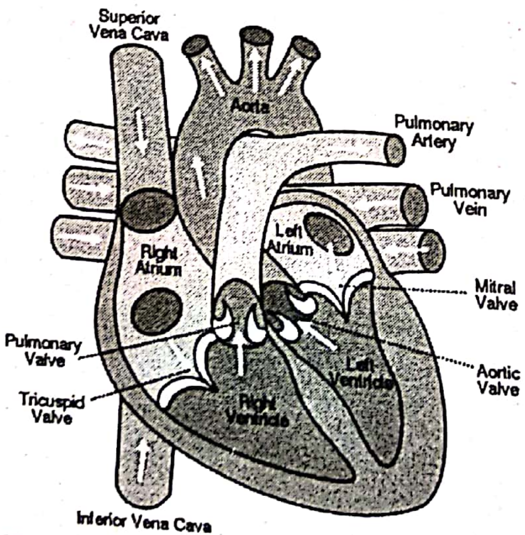
71. Vaccine is prepared by using a microorganism that shows association to disease. Antigen use to prepare vaccine may be weakened or killed. It will provide active acquired immunity against a particular disease.

72. In humoral immune response B-lymphocytes proliferate and form plasma clone cell and memory cells. Plasma clone cells produce antibodies which phagocytose an antigen or neutralize toxins produced by pathogens.

73. B-lymphocytes are cells of immune system that produced from bone marrow in human but in case of birds they are originated from Bursa of Fabricius which is a lymphoid mass.

74. Cell mediated immune response is a type of response in which antibodies does not involve. This type of immune response is actually due to involvement of T-lymphocytes and produce different types of chemical substance (cytokines) in response to antigen.

75.



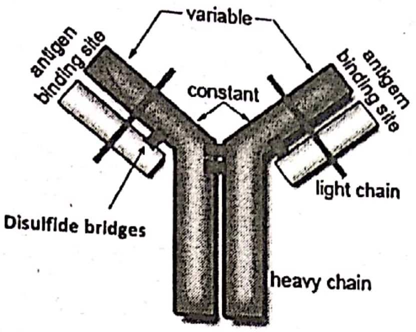
76. Average life-span of RBC's is about 120 days or 4 months, and after that they will be destroyed mainly in spleen.

77. Antibodies are synthesized by the activated B-lymphocytes e.g. plasma clone cells.

78. The thoracic duct is the largest lymphatic vessel within the human body. Lymph enters into left subclavian vein through thoracic duct.

79. The pulmonary vein carries oxygenated blood from the lungs to the left atrium.

80.



81. The thymus is a specialized primary lymphoid organ of the immune system. Within the thymus, thymus cell lymphocytes or T cells mature. T cells are critical to the adaptive immune system, where the body adapts specifically to foreign invaders.

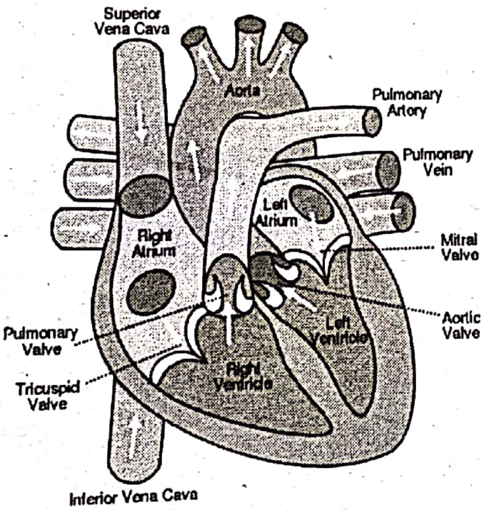
82. Antibodies are formed by four polypeptide chains (Two heavy and two light chains).

83. The humoral immune system deals with antigens from pathogens that are freely circulating, or outside the infected cells. Cellular immunity occurs inside infected cells and is mediated by T lymphocytes.

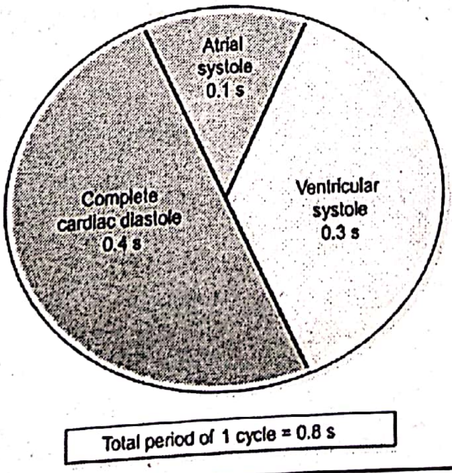
84. Two types of immunity exist — active and passive: Active immunity occurs when our own immune system is responsible for protecting us from a pathogen. Passive immunity occurs when we are protected from a pathogen by immunity gained from someone else.

85. Antibodies are produced by plasma cells of B-lymphocytes.

86.



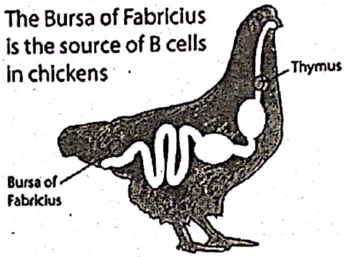
87.



88. The flaps of heart valves are attached with fibrous cords called chordae tendinae, to the papillary muscles which are extensions of the wall of the ventricles.

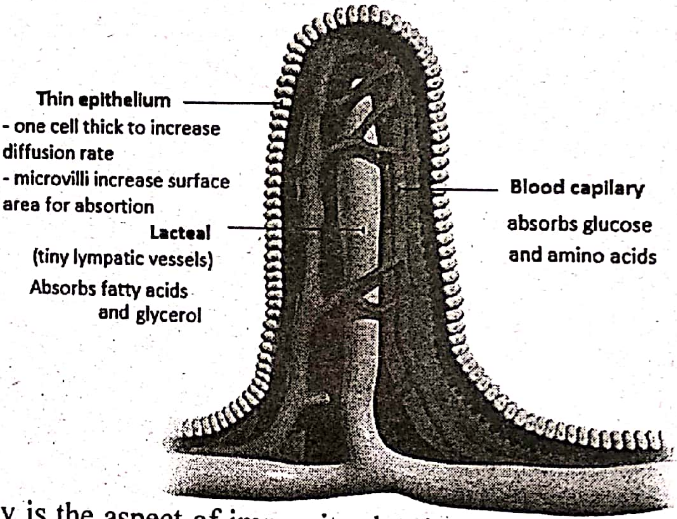
89. The SA node is the heart's natural pacemaker. The SA node consists of a cluster of cells that are situated in the upper part of the wall of the right atrium.

90.



91.

Longitudinal section through a villus

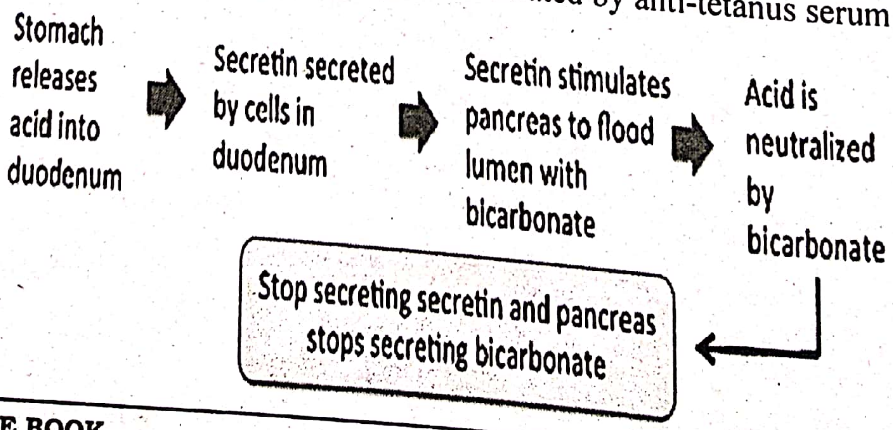

Thin epithelium
- one cell thick to increase diffusion rate
- microvilli increase surface area for absorption
Lacteal
(tiny lympatic vessels)
Absorbs fatty acids and glycerol
Blood capilary
absorbs glucose and amino acids

92. Humoral immunity is the aspect of immunity that is mediated by macromolecules found in extracellular fluids such as secreted antibodies, complement proteins, and certain antimicrobial peptides. Humoral immunity is named so because it involves substances found in the humors, or body fluids.

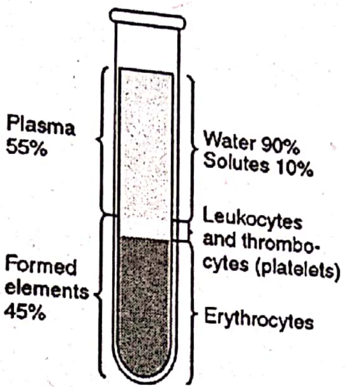
93. Transplant rejection is caused primarily by a cell-mediated immune response to HLA antigens expressed on donor antigen-presenting cells (APCs) transferred along with the transplanted organ. Recognition of donor HLA antigens on the cells of the graft induces vigorous T cell proliferation in the recipient.

94. Tetanus is a bacterial infection, which can be treated by anti-tetanus serum.

95.


Stomach releases acid into duodenum
Secretin secreted by cells in duodenum
Secretin stimulates pancreas to flood lumen with bicarbonate
Acid is neutralized by bicarbonate
Stop secreting secretin and pancreas stops secreting bicarbonate

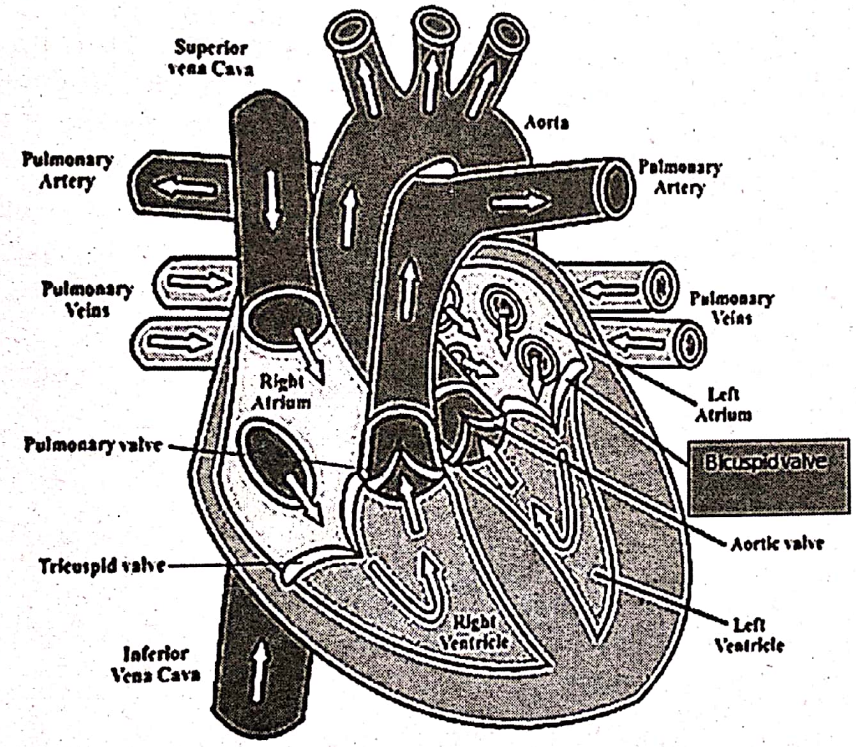
96.



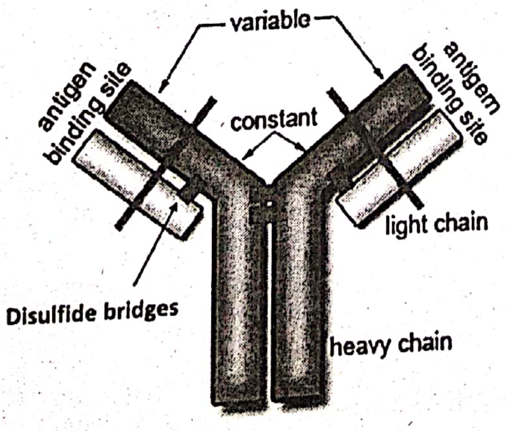
97. The heart is enclosed in a double membranous sac – the pericardial cavity, which contains the pericardial fluid.

98. These flaps of heart valves are attached with fibrous cords called chordae tendinae, to the papillary muscles which are extensions of the wall of the ventricles.

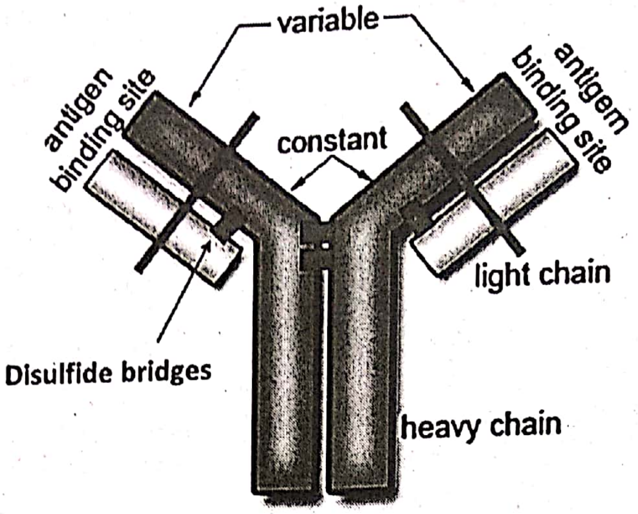
99.



100.



101.

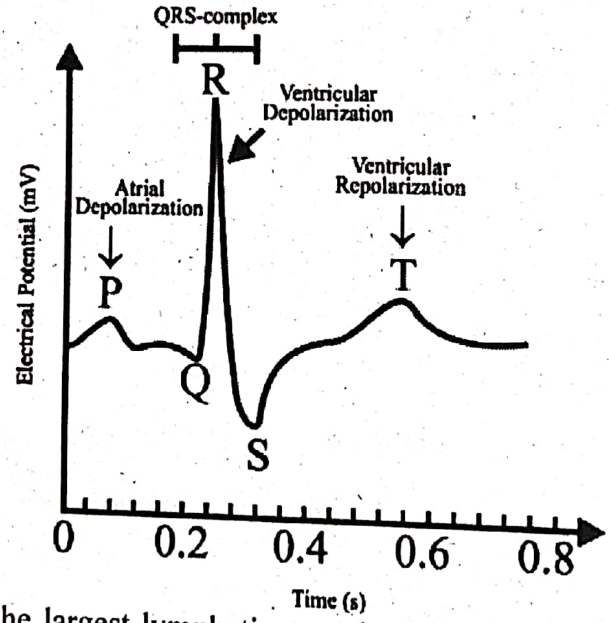


102. Humoral immunity is the aspect of immunity that is mediated by macromolecules found in extracellular fluids such as secreted antibodies, complement proteins, and certain antimicrobial peptides. Humoral immunity is named so because it involves substances found in the humors, or body fluids.

103. Passive immunity is given from mother to child through the placenta before birth, and through breast milk after birth. It can also be given medically through blood products that contain antibodies, such as immune globulin. This type of immunity is fast acting but lasts only a few weeks or months.

104. The passive rabies immunization is commonly used after a certain type of wild animal bites an accident etc.

105.

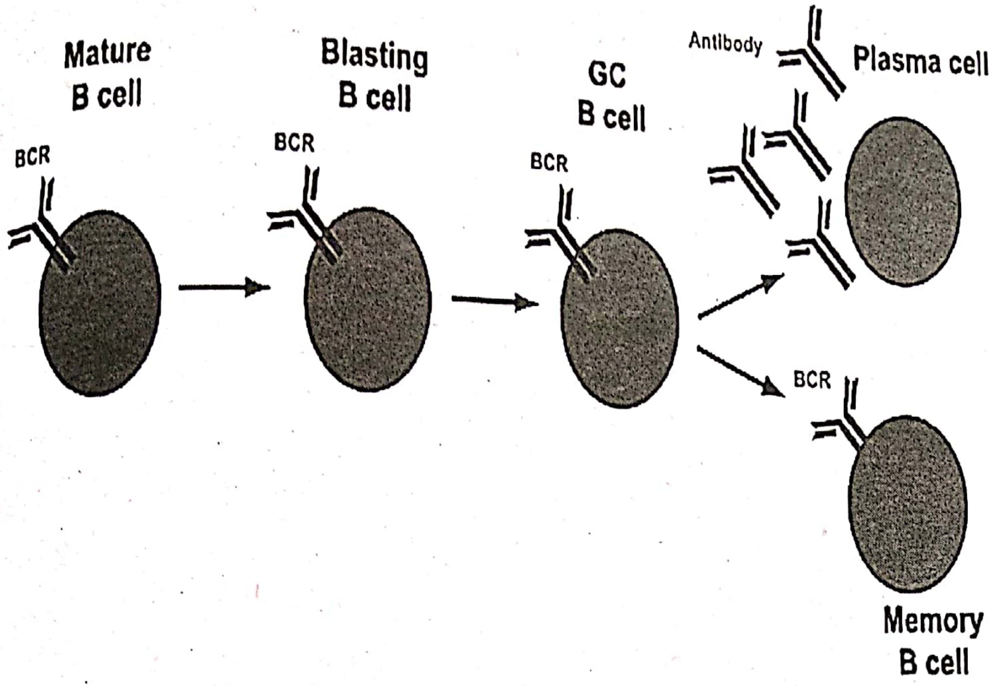


106. The thoracic duct is the largest lymphatic vessel within the human body. Lymph enters into left sub-clavian vein through thoracic duct.

107. A typical antibody has four polypeptide chains.

108. Two heavy and two light chains are present in an antibody molecule.

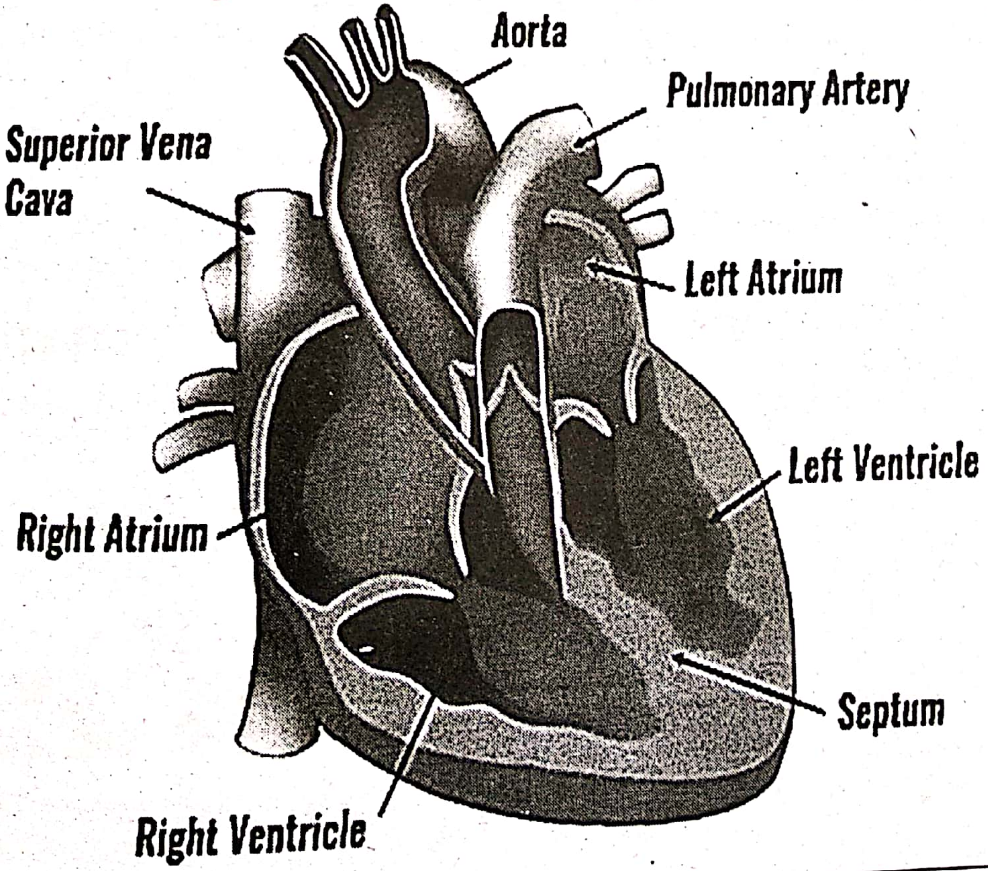
109.



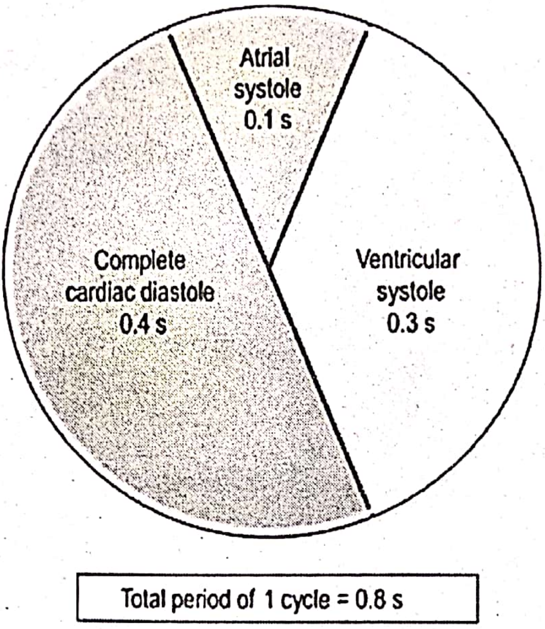
110. Two types of immunity exist; active and passive: Active immunity occurs when our own immune system is responsible for protecting us from a pathogen. Passive immunity occurs when we are protected from a pathogen by immunity gained from someone.

111. Active immunity is always antigen based while passive immunization is antibodies based.

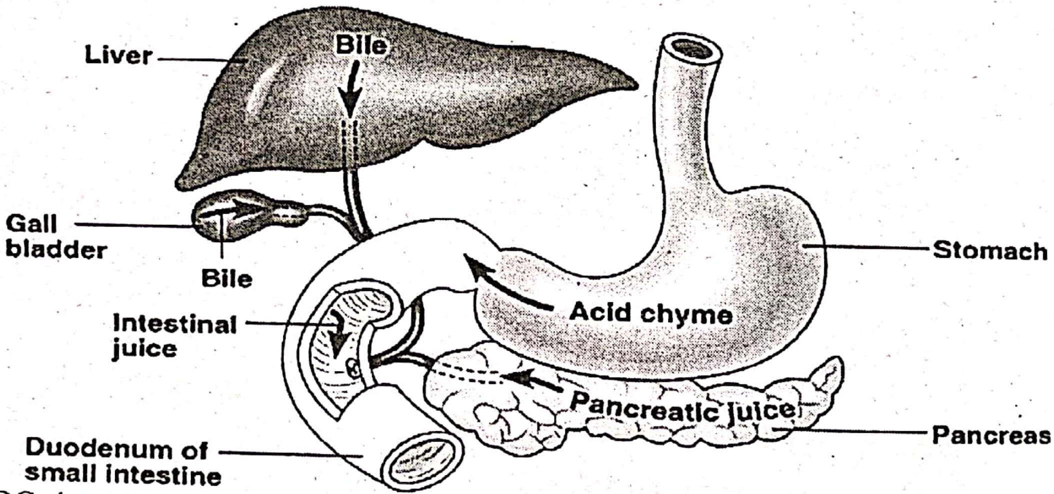
112.



113.

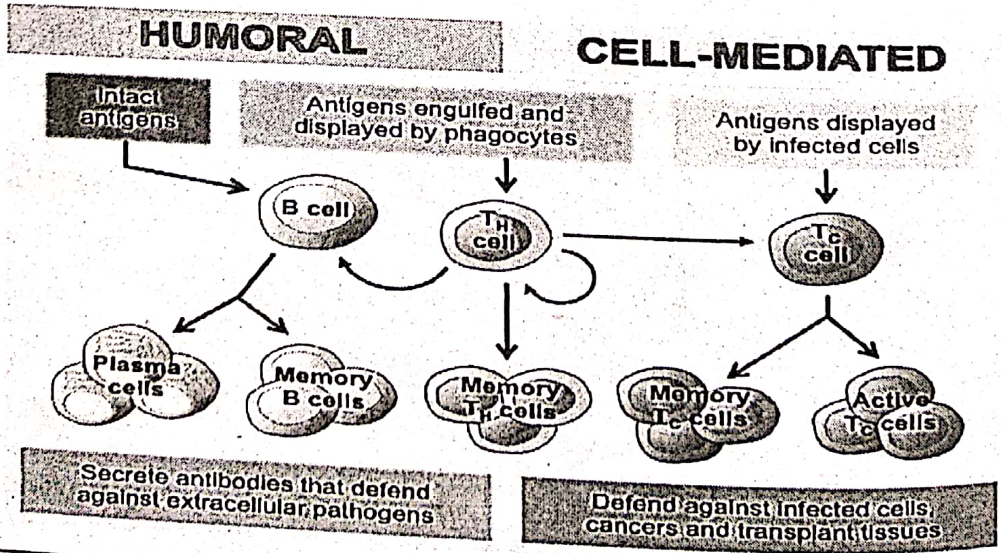


114. Liver play role in emulsification of fats by producing bile salts.



115. RBCs have no role in immunity.

116.


HUMORAL
CELL-MEDIATED
Intact antigens
Antigens engulfed and displayed by phagocytes
Antigens displayed by infected cells
B cell
T_H cell
Tc cell
Plasma cells
Memory B cells
Memory T_H cells
Memory Tc cells
Active Tc cells
Secrete antibodies that defend against extracellular pathogens
Defend against infected cells, cancers and transplant tissues

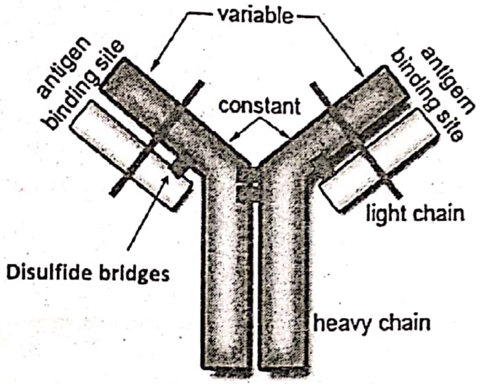
117. The wall of left ventricle is thicker (3 times) than that of right ventricle.

118. The SA node is the heart's natural pacemaker. The SA node consists of a cluster of cells that are situated in the upper part of the wall of the right atrium.

119. During atrial systole following event occur:

- AV valves open
- SL valves closed
- Muscles of atria contract and pump blood to ventricles
- Ventricles are relaxed and receive blood from atria.

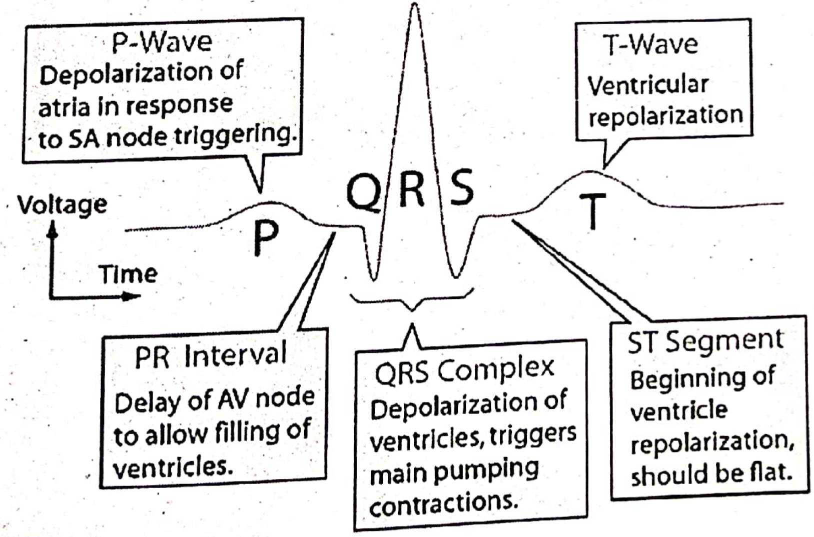
120.



121. Cell-mediated immunity is an immune response that does not involve antibodies. Rather, cell-mediated immunity is the activation of phagocytes, antigen-specific cytotoxic T-lymphocytes, and the release of various cytokines in response to an antigen

122. Anti-venom, also known as antivenin, venom antiserum, and anti-venom immunoglobulin, is a specific treatment for envenomation. It is composed of antibodies and used to treat certain venomous bites and stings. Anti-venoms are recommended only if there is significant toxicity or a high risk of toxicity.

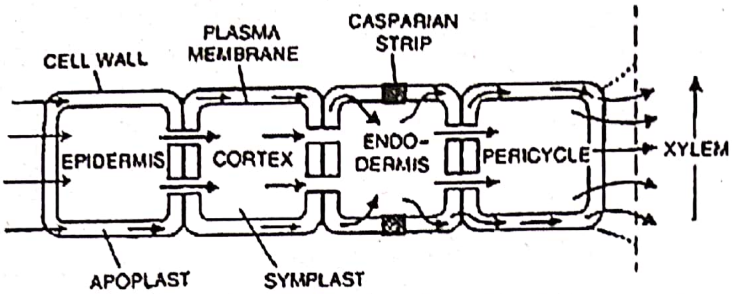
123.


P-Wave
Depolarization of atria in response to SA node triggering.
T-Wave
Ventricular repolarization
Q R S
T
P
Voltage
Time
PR Interval
Delay of AV node to allow filling of ventricles.
QRS Complex
Depolarization of ventricles, triggers main pumping contractions.
ST Segment
Beginning of ventricle repolarization, should be flat.

124. Semilunar valves are present in veins to prevent back flow of blood.

125. The thoracic duct is the largest lymphatic vessel within the human body. Lymph enters into left sub-clavian vein through thoracic duct.

126.

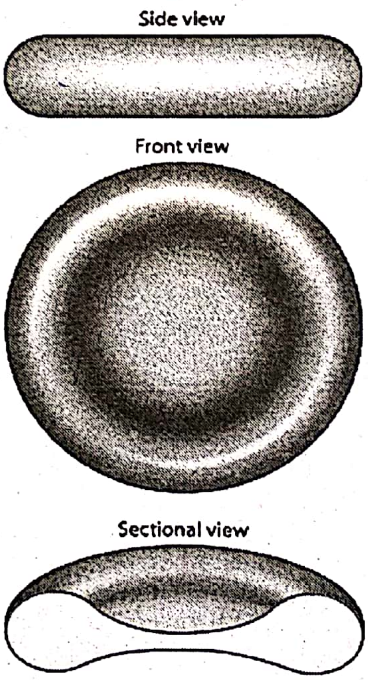


127. Rate of transpiration is directly proportional to light, temperature and wind, while it is inversely proportional to humidity in air.

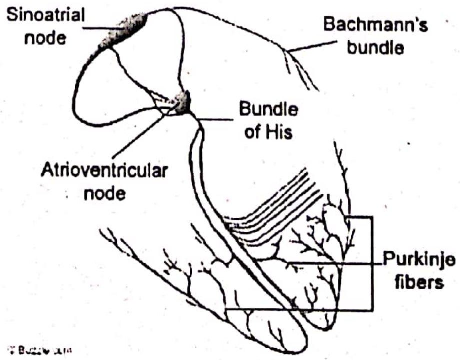
128. A substance used to stimulate the production of antibodies and provide immunity against one or several diseases, prepared from the causative agent of a disease, its products, or a synthetic substitute, treated to act as an antigen without inducing the disease.\

129. Naturally acquired active immunity occurs when the person is exposed to a live pathogen, develops the disease, and becomes immune as a result of the primary immune response. Artificially acquired active immunity can be induced by a vaccine, a substance that contains the antigen.

130.



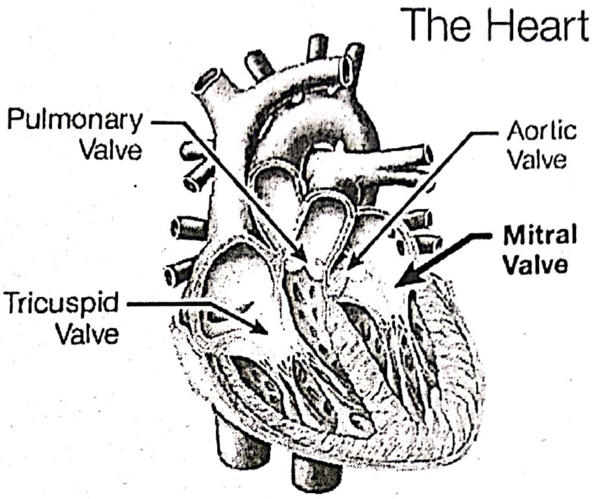
131.



132. The chordae tendineae (tendinous cords), colloquially known as the heart strings, are tendon-resembling fibrous cords of connective tissue that connect the papillary muscles to the tricuspid valve and the mitral valve in the heart.

133. Gene therapy is use for genetic problem's treatment. drugs are use for infectious diseases. Antibodies used for passive immunization.

134.

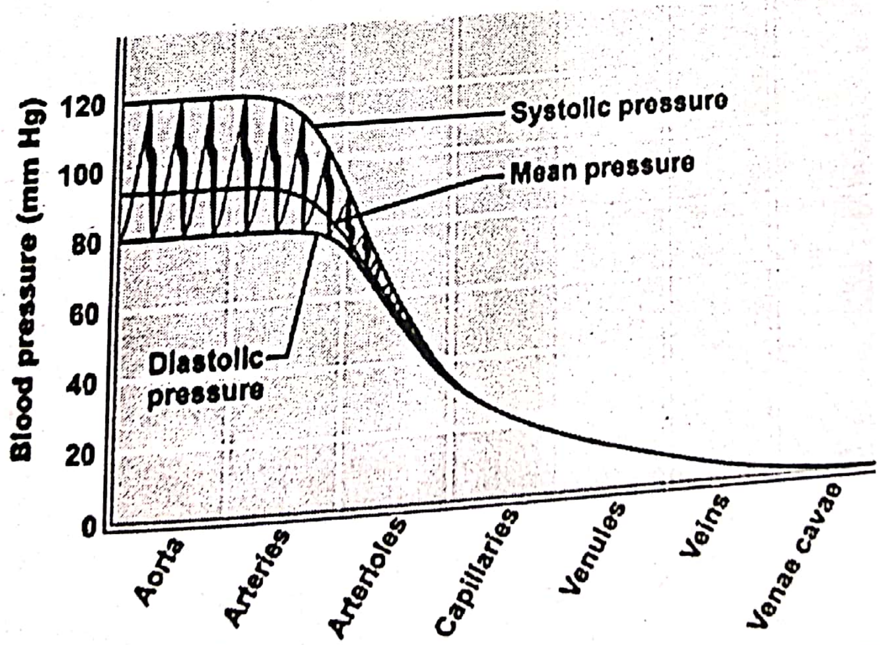


135. An antibiotic is a type of antimicrobial substance active against bacteria. Transposon, class of genetic elements that can "jump" to different locations within a genome.

136. Pulmonary vein carries oxygenated blood from lungs to left atrium of heart.

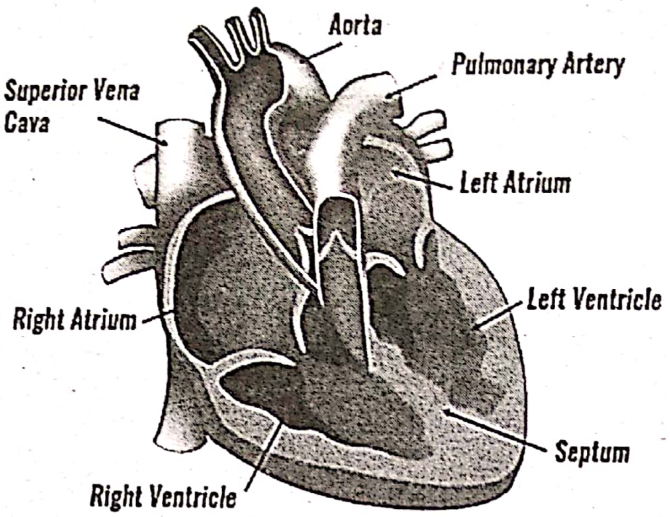
137. Lymphocytes are white blood cells that are also one of the body's main types of immune cells. They are made in the bone marrow and found in the blood and lymph tissue. The immune system is a complex network of cells known as immune cells that include lymphocytes.

138.



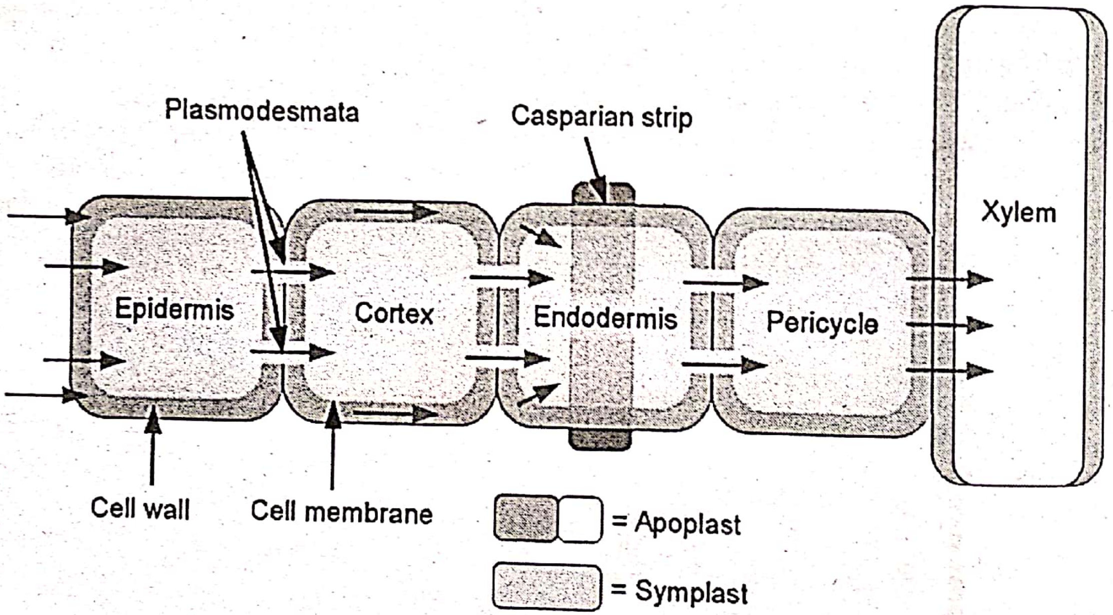
139. An autoimmune disease is a condition in which your immune system mistakenly attacks your body. The immune system normally guards against germs like bacteria and viruses. When it senses these foreign invaders, it sends out an army of fighter cells to attack them.

140.



141. B cells differentiate into plasma cells that produce antibody molecules closely modeled after the receptors of the precursor B cell. Once released into the blood and lymph, these antibody molecules bind to the target antigen (foreign substance) and initiate its neutralization or destruction.

142.



10 TOPIC

PROKARYOTES

PRACTICE EXERCISE

TOPIC-WISE MCQs

Q.1 In five kingdom classification unicellular, colonial and non-nucleated cells are placed in:

A. Plantae
B. Monera
C. Animalia
D. Protista

Q.2 Largest number of bacteria may be found in the arrangement called as:

A. Streptococci
B. Sarcina
C. Tetrad
D. Diplococci

Q.3 *Vibrio cholera* belongs to which category?

A. Coccus
B. Diplococcus
C. Bacillus
D. Spirochete

Q.4 Respiratory enzymes in bacteria are present in:

A. Mesosome
B. Cell wall
C. Nucleoid
D. Cytoplasm

Q.5 Dormant thick walled desiccation resistant body:

A. Endospore
B. Mesosome
C. Exospore
D. Cyst

Q.6 The moneran devoid of cell wall is:

A. Actinomycetes
B. Eubacteria
C. *Mycoplasma*
D. Archaebacteria

Q.7 Primary Gram's stain is:

A. Crystal violet
B. CV-I
C. Safranin
D. Iodine

Q.8 Archaebacteria lack in their structure/composition:

A. Cell wall
B. Glycoprotein
C. Plasma membrane
D. Peptidoglycan

Q.9 Bacterial plasma membrane is not involved in:

A. Maintenance of cell shape
B. Cell Division
C. DNA replication
D. Respiratory metabolism

Q.10 All are the characteristics of Gram positive bacteria except:

A. High content of peptidoglycan
B. High permeability
C. Techoic acid is present
D. Stain pink with primary dye

Q.11 Cell envelope of a bacterium does not include:

A. Capsule
B. Cell wall
C. Slime
D. Plasma membrane

Q.12 Bacterial membranes differ from eukaryotic membrane as they lack:

A. Peptidoglycan
B. Lipids
C. Phospholipid
D. Cholesterol

Q.13 What is not true about bacterial spore?

A. Produced during differentiation of vegetative cells
B. Are heat resistant
C. Are desiccation resistant
D. May be exospores or endospores

Q.14 Some bacteria are resistant to phagocytosis due to the presence of:
A. Cell wall
B. Capsule
C. Flagella
[✓ D. Slime]

Q.15 Bacteria that live in intestine and produce vitamin 'K' belongs to:
A. Coccus
B. Spirilla
[✓ C. Bacillus]
D. Spirochetes

Q.16 Resistance against antibiotics is mainly increasing because of:
[✓ A. Misuse of antibiotics]
B. Greenhouse effect
C. Global warming
D. Allergies

Q.17 Chemotherapeutic agent is/are:
[✓ A. Antibiotic]
B. Disinfectants
C. Vaccine
D. Both A & B

Q.18 Bacteria present in canned foods are:
[✓ A. *Clostridium botulinum*]
B. *Campylobacter*
C. *Salmonella*
D. *Streptococcus*

Q.19 Antibiotics and hormones can be sterilized by using:
[✓ A. Membrane filtration]
B. Radiations
C. Dry heat
D. Moist heat

Q.20 What is true about antibiotics?
A. Always protein in nature
B. Never cause side effects
C. Always produced from living cells
[✓ D. Can also be synthesized in laboratory]

Q.21 Treatment by using attenuated culture of bacteria is called ________. **(MDCAT 2014)**
A. Chemotherapy
B. Antisepsis
C. Sterilization
[✓ D. Vaccination]

Q.22 Which one of the following antibiotic causes permanent discoloration of teeth in young children if it is misused? **(MDCAT 2014)**
A. Penicillin
B. Sulfonamide
C. Streptomycin
[✓ D. Tetracycline]

Q.23 Peptidoglycan or murein is a special or distinctive feature of cell wall in: **(MDCAT 2014)**
A. Algae
[✓ B. Bacteria]
C. Fungi
D. Plants

Q.24 Antibiotics interfere with some aspect of growth or metabolism of the target organism such as: **(KMDC 2014)**
A. Synthesis of bacterial walls
B. Plasma membrane function
C. Protein synthesis
D. Enzyme action
[✓ E. All]

Q.25 Many bacteria are motile due to presence of: **(MDCAT 2016)**
[✓ A. Flagella]
B. Cilia
C. Pilli
D. Microtubules

Q.26 Syphilis is caused by: **(MDCAT 2016)**
[✓ A. Spirochete]
B. Water blooms
C. Nostoc
D. Cyanobacteria

Q.27 ________ is an invagination of cell membrane which helps in cell division. **(MDCAT 2016)**
A. Fimbriae
[✓ B. Mesosome]
C. Nucleoid
D. Endospore

Q.28 **Nucleoid is a structure not found in:** (MDCAT 2017)
A. Campylobacter
B. Spirochete
C. Cyanobacteria
[✓ D. Goblet cells]

Q.29 **Cell wall structure of a cell of unknown origin was studied and was found to contain polysaccharide chain linked with short chains of amino acid. What do you think it can be?** (MDCAT 2017)
[✓ A. Bacteria]
B. Algae
C. Fungi Cell
D. Cortex cells

Q.30 **Students were asked to give a guess about a unicellular organism with darkly stained nucleus. Which of the following can be straight away excluded from the list?** (MDCAT 2017)
A. *Paramecium*
B. *Plasmodium*
C. Amoeba
[✓ D. *Lactobacillus*]

Q.31 **In which of the following shapes, gut living symbiont Escherichia coli is found:** (MDCAT 2017)
A. Round
B. Spiral
C. Oval
[✓ D. Rod]

Q.32 **Arrangement of coccus bacteria in chain is called:** (MDCAT 2017)
[✓ A. Streptococci]
B. Tetrad
C. Staphylococci
D. Sarcina

Q.33 **DNA of bacteria is present in:** (MDCAT 2017)
[✓ A. Nucleoid]
B. Mitochondria
C. Nucleus
D. Mesosome

Q.34 **Find the characteristic true for Gram+ve bacteria:** (MDCAT 2017)
A. Periplasmic space present in all
B. Two major layers
[✓ C. Less lipids than Gram-ve]
D. Outer membrane present

Q.35 **If one of the following components is missing, bacteria cannot increase the number of its plasmid copies?** (ETEA 2017)
A. Antibiotic resistant gene
[✓ B. Origin of replication]
C. Cloning site
D. Ligases Enzymes

Q.36 **When tuft of the flagella is present at both the ends in the structure of bacterial cell, then the condition is called:**
A. Atrichous
B. Peritrichous
C. Lophotrichous
[✓ D. Amphitrichous]

Q.37 **Rod-shaped bacteria are known as __________.** (MDCAT 2018)
[✓ A. Bacilli]
B. *Vibrio*
C. Cocci
D. Sarcina

Q.38 **If lipopolysaccharides did not appear in the wall of bacteria on staining, then it will be known as __________.** (MDCAT 2018)
[✓ A. Gram positive]
B. Gram negative
C. Gram positive & gram negative
D. Capsule

Q.39 **Which of the following are divided by fission?** **(NTS 2018)**

A. Viruses
B. Viroids
C. Fungus
[✓ D. Bacteria]

Q.40 **A bacterium which has a group of two or more flagella inserted at one pole of the cell:** **(ETEA 2019)**

A. Monotrichous
B. Peritrichous
[✓ C. Lophotrichous]
D. Amphitrichous

Q.41 **The following are sexual reproduction methods in bacteria except: (ETEA 2019)**

A. Transformation
B. Transduction
[✓ C. Binary fission]
D. Conjugation

Q.42 **Select the method which causes the oxidation of chemical constituent of a bacterial cell:** **(PMC 2020)**

A. Steam
B. Filtration
[✓ C. Dry heat]
D. Radiation

Q.43 **Which of the following is true about the structure of a typical bacterium? (PMC 2020)**

A. It has cell wall
B. It has genetic material
C. It has cytoplasm
[✓ D. All of the above]

ANSWER KEY

TOPIC- WISE MCQS & PAST PAPER MCQs

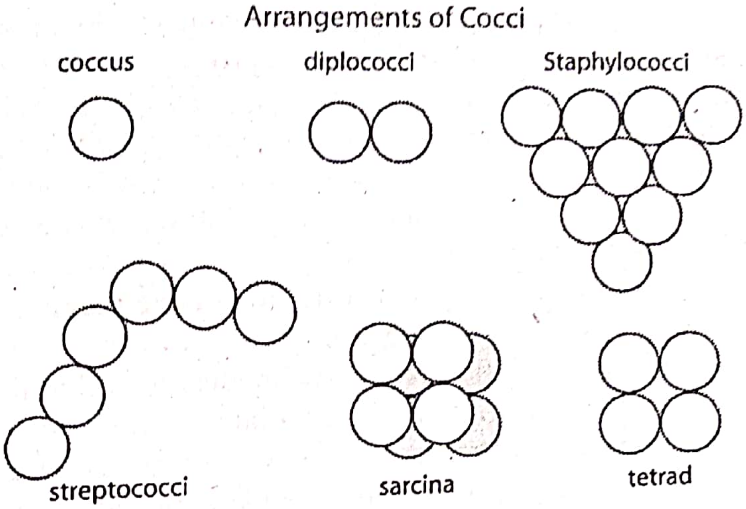
1	B	11	D	21	D	31	D	41	C
2	A	12	D	22	D	32	A	42	C
3	D	13	A	23	B	33	A	43	D
4	A	14	D	24	E	34	C		
5	D	15	C	25	A	35	B		
6	C	16	A	26	A	36	D		
7	A	17	A	27	B	37	A		
8	D	18	A	28	D	38	A		
9	A	19	A	29	A	39	D		
10	D	20	D	30	D	40	C		

EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

1. In five kingdom classification system, unicellular, colonial and non-nucleated organisms are placed in kingdom Monera while kingdom Protista, Plantae and Animalia have eukaryotic organisms.

2.



3. Coccus and diplococcus are round in shape while *Vibrio cholera* is spirochete.
4. Membranous invaginations present in bacteria are known as mesosomes carrying enzymes for respiration and cell division.
5. Dormant, thick walled desiccation resistant structures are cyst while spores are metabolically dormant bodies and are produce at a late stage of cell growth.
6. *Mycoplasma* is the only genus of prokaryotes which are devoid of peptidoglycan cell wall.
7. The primary stain used in Gram staining is crystal violet while safranine is the secondary stain.
8. Archaebacterial cell walls are composed of different polysaccharides and proteins, with no peptidoglycan.
9. Bacterial plasma membrane is involved in DNA replication, cellular division and respiratory metabolism while maintenance of cell shape is the function of cell wall.
10. Gram positive bacteria shows purple colour when stained with primary dye (crystal violet), while gram negative bacteria shows purple colour due to safranine.
11. Capsule, slime and cell wall are included in the cell envelope of bacteria while cell membrane is not included.
12. Phospholipid and proteins both are component of membrane of both cells i.e. prokaryotic cell and eukaryotic cell. Peptidoglycan is present in the cell wall of bacterial cell. Cholesterol is present in the cell membrane of eukaryotic cells only.
13. As spore formation occurs during unfavorable condition i.e. selective antibiotic pressure and heat while differentiation of vegetative cells found in favorable conditions.
14. Slime is involved in pathogenicity that's why resistant to phagocytosis.
15. Bacteria that live in intestine and produce vitamin K are useful strain of *E. coli* which are Gram negative bacilli.
16. Now antibiotics are used on regular basis and bacteria are getting resistance against antibiotics due to enhanced exposure.

17. Chemotherapeutic agents are the antibiotics that work with natural defense and stop the growth of bacteria and other microbes.

18. The bacteria present in canned food is *C. botulinum* and causes severe form of food poisoning. Botulism develops by the use of improperly canned or otherwise preserved food, especially meat.

19. Antibiotics and hormones are heat sensitive molecules and can be degraded if sterilized with the dry heat or moist heat. That is why such substances are sterilized by using specialized filters.

20. Antibiotics are of two types i.e. natural and synthetic. So these can be synthesized in laboratory, moreover these can be or cannot be protein in nature and produce side effects.

21. A vaccine is a biological preparation that provides active acquired immunity to a particular infectious disease and this treatment is by using attenuated culture of bacteria.

22. Tetracycline has been on the market for over 60 years and is used in the treatment of many gram negative and gram positive infections; it causes permanent staining of the teeth if used in children less than the age of 8.

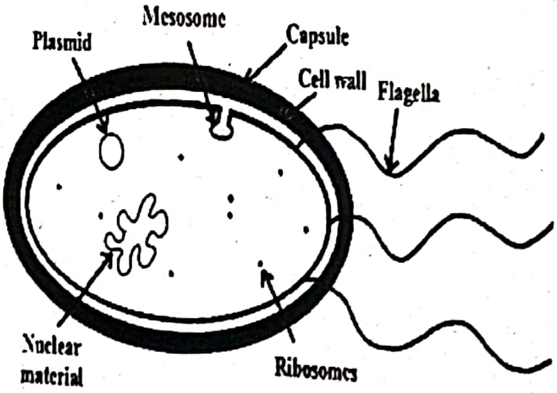
23. The cell wall is the principal stress-bearing and shape-maintaining element in bacteria formed of Peptidoglycan, also called murein.

24. Antibiotics, also known as antibacterial, are medications that destroy or slow down the growth of bacteria by interfering with bacterial cell wall synthesis, plasma membrane functions, protein synthesis, enzymes actions, DNA replication etc.

25. For many pathogenic bacteria, flagellum-dependent motility and chemotaxis are present.

26. "syphilis", is an infection caused by the bacteria *Treponema pallidum* (Spirochete). Syphilis is spread by direct contact with an infected individual, such as: Sexual contact.

27. Mesosomes help with cell division, aiding cell wall synthesis and DNA replication.



28. Goblet cells are eukaryotic cells and have nucleus in them while nucleoid is found in bacterial cells so D is a good option among all.

29. Peptidoglycan or murein is a polymer consisting of sugars and amino acids that forms a mesh-like layer outside the plasma membrane of most bacteria, forming the cell wall.

30. *Lactobacillus* is a genus of Gram-positive, aerotolerant anaerobes or microaerophilic, rod-shaped, non-spore-forming bacteria. So don't have nucleus for being a prokaryotic cell.

31. *Escherichia coli* is a member of the family *Enterobacteriaceae*, which includes gram-negative, facultatively anaerobic rod-shaped bacteria.

32. Pairs of cocci are called diplococci; rows or chains of such cells are called streptococci; grapelike clusters of cells, staphylococci; packets of eight or more cells, sarcina; and groups of four cells in a square arrangement, tetrads.

33. Bacteria do not have a membrane-bound nucleus, and their genetic material is typically a single circular bacterial chromosome of DNA located in the cytoplasm in an irregularly shaped body called the nucleoid.

34. Gram +ve bacteria have less lipids and more peptidoglycan as compared to Gram –ve bacteria.

35. Due to origin of replication bacteria can replicate its genome.

36.

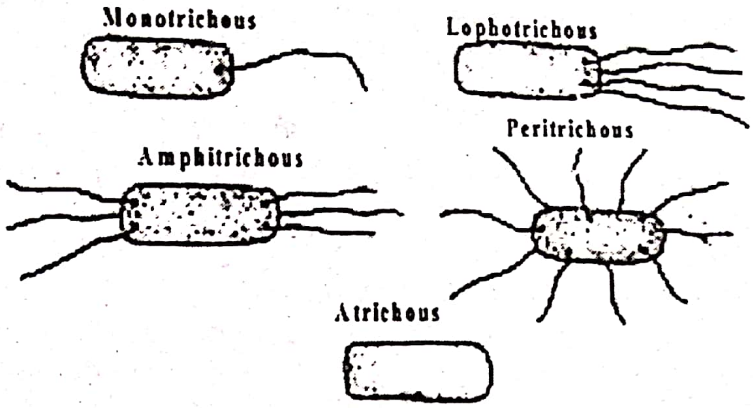
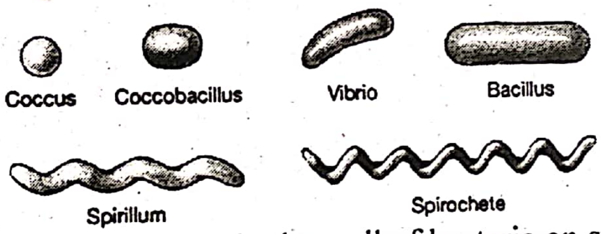


Fig :- Flagellar arrangement in Bacteria

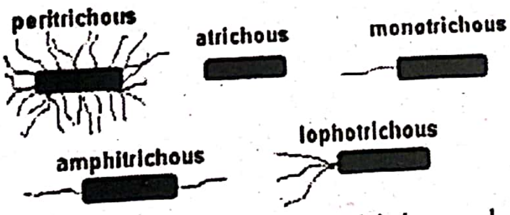
37.



38. If lipopolysaccharides did not appear in the wall of bacteria on staining then it will be known as Gram positive as we know lipopolysaccharide layer is a feature of Gram –ve bacteria.

39. Bacteria can divide by binary fission.

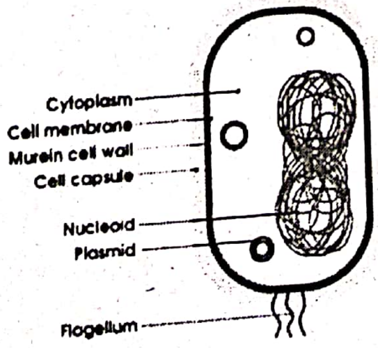
40.



41. Binary fission is asexual mode of reproduction in which one bacteria divide itself into two daughter cells.

42. Heating is the most commonly used method of sterilization and Dry Heat Kills by oxidation effects.

43.



11 TOPIC

REPRODUCTION

PRACTICE EXERCISE

TOPIC-WISE MCQs

Q.1 Which one of the following is a diploid structure?

A. Secondary spermatocyte
B. Spermatid
[✓ C. Primary spermatocyte]
D. Spermatozoa

Q.2 Which one of the following causes growth and development of germinal epithelium of the testes?

A. Inhibin
B. LH
C. Testosterone
[✓ D. FSH]

Q.3 Production of slightly acidic fluid with citrate as a main nutrient source is the function of:

A. Bulbourethral gland
[✓ B. Prostate gland]
C. Seminal vesicles
D. Cowper's gland

Q.4 Structure that undergoes meiosis I is:

[✓ A. Primary spermatocyte]
B. Spermatid
C. Secondary spermatocyte
D. Spermatogonium

Q.5 Spermatozoa are formed from spermatids as a result of:

A. Mitosis
[✓ B. Differentiation]
C. Meiosis I
D. Meiosis II

Q.6 Prior to emission and ejaculation, spermatozoa are stored in:

A. Urethra
B. Seminal vesicles
[✓ C. Epididymis]
D. Prostate gland

Q.7 Fructose production as nutritional component for sperms is the function of:

A. Bulbourethral gland
B. Prostate gland
[✓ C. Seminal vesicles]
D. Seminiferous tubules

Q.8 Human sperm and ova show similarities in following respect:

[✓ A. Both are haploid]
B. Both carry identical genetic makeup
C. Both are having approximately same size
D. Both possess good mobility

Q.9 All of the following contributes to the formation of semen except:

A. Seminal vesicles
B. Cowper's gland
C. Prostate gland
[✓ D. Vas deferens]

Q.10 Correct sequence of events in spermatogenesis is:

A. Spermatogonia > Spermatids > Spermatocytes > Spermatozoa
B. Primary spermatocytes > Secondary spermatocytes > Spermatozoa
[✓ C. Spermatogonia>Primary spermatocyte > Secondary spermatocytes>Spermatid> Spermatozoa]
D. Secondary spermatocyte > Spermatozoa > Spermatogonia> Spermatids

Q.11 All of the following structures are paired except:

A. Testes
B. Seminal vesicles
C. Bulbourethral gland
[✓ D. Prostate gland]

Q.12 Main function performed by bulbourethral gland in humans is/are:

A. Sperm maturation
[✓ B. Neutralization of urethra]
C. Sperm production
D. Semen formation

Q.13 How many spermatozoa and ova are produced from 50 primary spermatocytes and 50 primary oocytes?

A. 200 spermatozoa and 100 ova
[✓ B. 200 spermatozoa and 50 ova]
C. 100 spermatozoa and 50 ova
D. 100 spermatozoa and 100 ova

Q.14 Motile and completely mature cell with flagellum is:
A. Spermatid
B. Spermatocyte
C. Spermatogonium
[✓ D. Spermatozoa]

Q.15 Fertilization of a secondary oocyte by sperm takes place at:
A. Proximal part of cervix
B. Distal part of oviduct
[✓ C. Proximal part of uterine tube]
D. Distal part of cervix

Q.16 What will be the effect on the duration of menstrual cycle if one of the ovaries is removed?
A. Duration will be more than 28 days
B. Menstrual cycle stops completely
C. Duration will be less than 28 days
[✓ D. Menstrual cycle remains unaffected]

Q.17 Layer of uterus that is under control of oestrogen:
A. Mesometrium
[✓ B. Endometrium]
C. Myometrium
D. Perimetrium

Q.18 Progesterone production within ovaries is accomplished by following structure:
A. Primary follicle
[✓ B. Ruptured follicle]
C. Graffian follicle
D. Corpus albicans

Q.19 The layer of uterus that is shed with each reproductive cycle is:
A. Mesometrium
[✓ B. Endometrium]
C. Myometrium
D. Perimetrium

Q.20 Maximum chances of fertilization in human females exist usually during _____ of reproductive cycle.
A. 11th to 14th day
B. Immediately after menstruation
[✓ C. 14th to 16th day]
D. 6th to 9th day

Q.21 After fertilization, embryo implants itself to the _________ part of uterus.
[✓ A. Endometrium]
B. Myometrium
C. Mesometrium
D. Perimetrium

Q.22 In a menstrual cycle of 45 days, what would be the most probable day of ovulation?
A. 14th
[✓ B. 31th]
C. 40th
D. 20th

Q.23 Endometrium shows maximum thickness during:
A. Start of proliferative phase
[✓ B. Secretary phase]
C. End of Proliferative phase
D. Menstruation

Q.24 Menstruation is the discharge of:
A. Blood, water and cellular debris
[✓ B. Blood, mucous and cellular debris]
C. Lymph, mucous and solid debris
D. Lymph, blood and cellular debris

Q.25 The development of secondary oocyte into ovum is completed in:
[✓ A. Uterine tube]
B. Ovary
C. Uterus
D. Graffian follicle

Q.26 What will be the effect on the duration of menstrual cycle if one of the ovaries is removed?
A. Duration will be more than 28 days
B. Menstrual cycle stops completely
C. Duration will be less than 28 days
[✓ D. Menstrual cycle remains unaffected]

Q.27 Menstruation usually continues:
[✓ A. 3–7 days]
B. 20–22 days
C. 1–3 days
D. 15–17 days

Q.28 In young females, ovulation occurs at _____________ day of reproductive cycle.
A. 18th
[✓ B. 14th]
C. 28th
D. 24th

Q.29 Multiple births may occur in humans when:
A. There is an excess of sperms
B. Over activity of pituitary occurs
C. Menstruation occurs
[✓ D. Multiple ovulations occurs]

Q.30 Which layer of uterus undergoes cyclic changes during menstrual cycle?
A. Mesoderm
B. Myometrium
C. Perimetrium
[✓ D. Endometrium]

Q.31 At ovulation egg is released as:
A. Primary oocyte
B. Ovum
[✓ C. Secondary oocyte]
D. Polar body

Q.32 One of the followings is related to ovary:
A. Menstrual phase
B. Proliferative phase
C. Secretary phase
[✓ D. Luteal phase]

Q.33 Only Graffin follicle grows with egg. Rest of follicles are destroyed by a process:
[✓ A. Follicle atresia]
B. Osteoporesia
C. Ovulation
D. Both a and c

Q.34 First menstrual cycle starts at puberty. This is termed as:
A. Menopause
[✓ B. Menarche]
C. Metrorrhagia
D. None

Q.35 Ovulation day in normal menstrual cycle is on day:
A. 13th
B. 18th
[✓ C. 14th]
D. Cannot be measured

Q.36 Maintenance of pregnancy is made possible mainly by:
A. FSH
[✓ B. Progesterone]
C. Prolactin
D. Both a and b

Q.37 Shortest phase in the menstruation cycle is:
[✓ A. Ovulatory phase]
B. Luteal phase
C. Follicular phase
D. Menstrual phase

Q.38 Female menstrual cycle controlled by:
A. Progesterone
[✓ B. Gonadotrophin]
C. Estrogen
D. ICSH

Q.39 Complete stop of menstrual cycle is called as:
[✓ A. Menopause]
B. Menarche
C. Andropause
D. Menstruation

PAST PAPER MCQs

Q.40 The first cells produced by the repeated cell division of germinal epithelium of testis are: **(MDCAT 2010)**
A. Interstitial cells
B. Secondary spermatocytes
[✓ C. Spermatogonia]
D. Spermatids

Q.41 A type of cell in human testes which produces testosterone is called: **(MDCAT 2011)**
[✓ A. Interstitial Cells]
B. Sertoli Cells
C. Germ Cells
D. Spermatocytes

Q.42 Which one of the following differentiates directly into mature sperm? **(MDCAT 2011)**
A. Primary spermatocyte
B. Spermatogonia
C. Secondary spermatocyte
[✓ D. Spermatid]

Q.43 What is the location of interstitial cells in testes? (MDCAT 2013)
A. Inside the seminiferous tubules B. Among the germinal epithelial cells
[✓ C. Between the seminiferous tubule] D. Around the testes

Q.44 A type of cells in human testes which produce testosterone are called? (MDCAT 2013)
A. Germ cells [✓ B. Interstitial cells]
C. Sertoli cells D. Spermatocytes

Q.45 Spermatogonia differentiate directly into? (MDCAT 2013)
[✓ A. Primary spermatocytes] B. Spermatozoa
C. Secondary spermatocytes D. Spermatids

Q.46 Testosterone is produced by which one of the following? (MDCAT 2014)
A. Sertoli cells [✓ B. Interstitial cells]
C. Germinal epithelium D. Spermatogonia

Q.47 Which of the following directly develops into sperms? (MDCAT 2014)
A. Primary spermatocytes B. Secondary spermatocytes
[✓ C. Spermatids] D. Spermatogonia

Q.48 Yellowish glandular structure formed after the release of egg from follicle is called: (MDCAT 2014)
A. Corpus callosum [✓ B. Corpus luteum]
C. Graffian follicle D. Follicle atresia

Q.49 On puberty, the development of primary follicles is stimulated by: (MDCAT 2014)
A. ICSH B. LH
[✓ C. FSH] D. Estrogen

Q.50 In females, FSH stimulates the ovary to produce: (MDCAT 2015)
A. Progesterone [✓ B. Estrogen]
C. Prolactin D. Oxytocin

Q.51 The oocyte released during ovulation is in: (MDCAT 2015)
A. Anaphase I B. Metaphase I
C. Prophase I [✓ D. Metaphase II]

Q.52 In which phase of human female menstrual cycle, endometrium prepares for the implantation of embryo? (MDCAT 2015)
A. Proliferative phase [✓ B. Secretory phase]
C. Menstrual phase D. Ovulation phase

Q.53 Events of menstrual cycle are regulated by the: (MDCAT 2016)
A. Ethylene B. Auxins
[✓ C. Gonadotrophins] D. Gibberellins

Q.54 Decrease of FSH and increase of estrogen cause pituitary gland to secrete: (MDCAT 2016)
A. Somatotropin B. Testosterone
[✓ C. Luteinizing hormone] D. Spermatogonium

Q.55 FSH stimulates the production of estrogen hormone which has two targets__________ and __________. (MDCAT 2017)
A. Uterus, posterior pituitary [✓ B. Uterus, anterior pituitary]
C. Ovaries, uterus D. Ovaries, hypothalamus

Q.56 Ovulation is suppressed by progesterone via: **(MDCAT 2017)**
[✓ A]. Inhibition of LH only
B. Inhibition of LH & stimulation of FSH
C. Inhibition of FSH & stimulation of LH
D. Inhibition of both FSH & LH

Q.57 Which of the following hormone suppresses ovulation? **(MDCAT 2017)**
[✓ A]. Progesterone
B. FSH
C. Insulin
D. Prolactin

Q.58 Which of the following hormone causes ovulation? **(MDCAT 2017)**
[✓ A]. LH
B. Estrogen
C. Progesterone
D. FSH

Q.59 Which hormone is released in female in response to FSH from pituitary gland? (MDCAT 2018)
A. Oxytocin
[✓ B]. LH
C. ADH
D. Progesterone

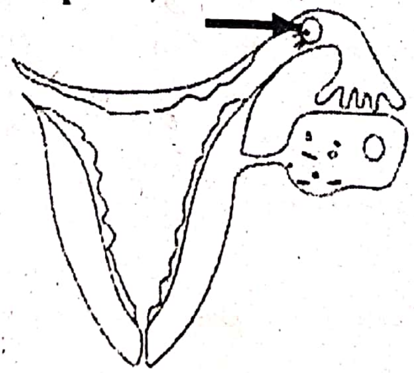
Q.60 Which of the following hormone acts on the uterus wall for thickening? **(MDCAT 2018)**
A. Zona pellucida
B. Oxytocin
[✓ C]. Progesterone
D. Follicle stimulating hormone

Q.61 During spermatogenesis, the ____________, which are haploid cells eventually mature into spermatozoa/mature sperms? **(MDCAT 2019)**
A. Secondary spermatocytes
B. Spermatogonia
C. Primary spermatocytes
[✓ D]. Spermatids

Q.62 Which hormonal pair would maintain the endometrium and make it receptive for implantation of embryo? **(MDCAT 2019)**
A. Luteinizing Hormone and Progesterone
B. Estrogen and Follicle Stimulating Hormone
C. Luteinizing Hormone and Follicle Stimulating Hormone
[✓ D]. Estrogen and Progesterone

Q.63 Which of the following hormone stimulates the ovulation from the follicle into oviduct? **(MDCAT 2019)**
[✓ A]. Luteinizing hormone
B. Estrogen
C. Follicle stimulating hormone
D. Progesterone

Q.64 The hormone produced at this particular stage in the menstrual cycle shown in the diagram is (egg is shown by arrow): **(AJK 2019)**



A. Oxytocin
B. Follicle stimulating hormone
[✓ C]. Progesterone
D. Luteinizing hormone

Q.65 On the onset of puberty in the females, the pituitary gland releases the: (AJK 2019)
A. Progesterone
B. Luteinizing hormone
C. Oxytocin
[✓ D]. Follicle stimulating hormone

Q.66 **Secretion of FSH is inhibited by:** (AJK 2019)

A. Testosterone
B. Estrogen
C. Progesterone
D. LH

Q.67 **Progesterone is secreted by:** (ETEA 2019)

A. Corpus luteum
B. Ripening follicles
C. Uterine epithelium
D. Fertilized egg

Q.68 **Which one of the following represents the changes that occur in the ovary and the uterus approximately every 28 days involving ovulation with the breakdown and loss of the lining of the uterus?** (PMC 2020)

A. Ovulation
B. Uterine cycle
C. Menstrual cycle
D. Embryo formation

Q.69 **Which of the following hormones of the pituitary gland regulate the menstrual cycle?** (PMC 2020)

A. Follicle stimulating hormone and estrogen
B. Luteinizing hormone and estrogen
C. Follicle stimulating hormone and Luteinizing hormone
D. Estrogen and progesterone

ANSWER KEY

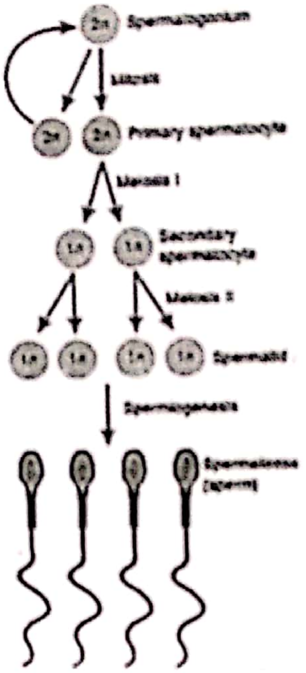
TOPIC-WISE MCQs

1	C	11	D	21	A	31	C	41	A	51	D	61	D
2	D	12	B	22	B	32	D	42	D	52	B	62	D
3	B	13	B	23	B	33	A	43	C	53	C	63	A
4	A	14	D	24	B	34	B	44	B	54	C	64	C
5	B	15	C	25	A	35	C	45	A	55	B	65	D
6	C	16	D	26	D	36	B	46	B	56	A	66	B
7	C	17	B	27	A	37	A	47	C	57	A	67	A
8	A	18	B	28	B	38	B	48	B	58	A	68	C
9	D	19	B	29	D	39	A	49	C	59	B	69	C
10	C	20	C	30	D	40	C	50	B	60	C		

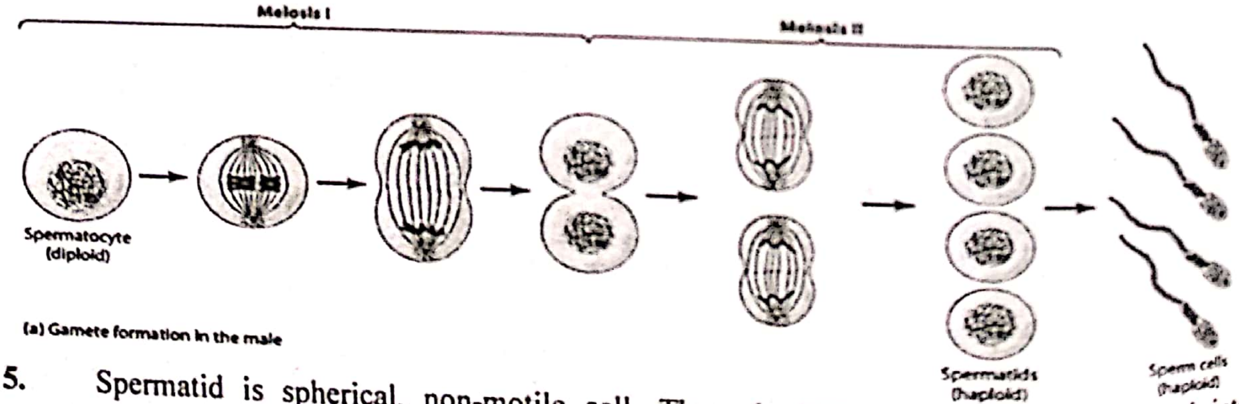
EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

1.



2. Follicle stimulating hormone is one of the hormones essential to pubertal development and the function of women's ovaries and men's testes. In women, this hormone stimulates the growth of ovarian follicles in the ovary before the release of an egg from one follicle at ovulation.
3. The prostate gland is a male reproductive organ whose main function is to secrete prostate fluid (acidic fluid with citrate), one of the components of semen.
4.



(a) Gamete formation in the male

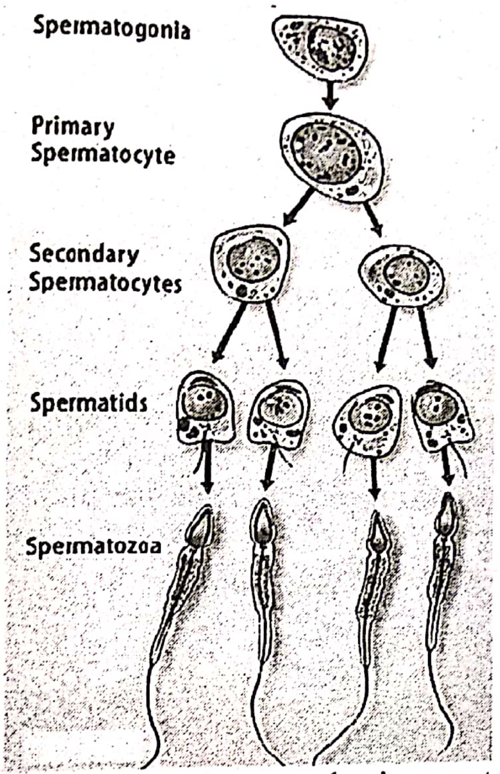
5. Spermatid is spherical, non-motile cell. Through differentiation, it is changed into spermatozoa where it forms tail and becomes motile.
6. The epididymis is a tightly coiled mass of thin tubes that carries sperm from the testes to the vas deferens. Sperm matures as it passes through the epididymis.
7. Seminal vesicles release up to 60% of the fluid found in semen. The other 40% is produced by the prostate and bulbourethral glands. The fluid produced by seminal vesicles contains several key components: Fructose: which is a sugar that is produced to provide energy for swimming sperm cells.

Both the sperm and ova are haploid cells. All others are dissimilarities

8. The vas deferens transports mature sperm to the urethra.

9.

10.



11. The accessory glands of the male reproductive system are the seminal vesicles (paired), bulbourethral gland (paired) and the prostate gland (unpaired). Testes are also paired.
12. Bulbourethral glands produce a mucus-like fluid called pre-ejaculate. This fluid is a viscous, clear, and salty liquid that neutralizes any residual acidity in the urethra
13. Each primary spermatocyte produces four sperms while each primary oocyte gives rise to one ovum (secondary oocyte) and three polar bodies.
14. The mature motile male sex cell of an animal, by which the ovum is fertilized, typically having a compact head and one or more long flagella for swimming.
15. Oviduct is also called as uterine tube. Its proximal end is important for fertilization
16. An oophorectomy is a surgical procedure to remove one or both ovaries. The ovaries produce eggs as well as the hormones estrogen and progesterone. Removal of one ovary still allows a woman to continue to menstruate and to have children, as long as the remaining ovary is not damaged.
17. Thickness of endometrium changes in different phases of menstrual cycle. Estrogen and progesterone make it more thick and spongy.
18. Ruptured follicle after ovulation change to yellow glandular structure called as corpus luteum, which secrete progesterone.
19. The endometrium changes throughout the menstrual cycle. It becomes thick and rich with blood vessels to prepare for pregnancy. If pregnancy does not occur, part of the endometrium is shed, causing menstrual bleeding.
20. Normally 14th day is the day of ovulation and according to the life span of egg and sperms option C is the most appropriate one.

21. Under normal circumstances, fertilization occurs in one of the Fallopian tubes, and then the fertilized egg begins to make its way to the uterus. By about the fifth day after fertilization, the embryo finally reaches the uterus, where it implants itself in the endometrium.

22. Under normal conditions, luteal phase of menstrual cycle is of 14 days. If cycle is going to be completed in 45 days, then 45-14=31, so 31st day will be day of ovulation.

23. During the secretory or luteinizing phase (14th to 28th day) the endometrium differentiates itself due to the influence of progesterone (from the corpus luteum) and attains its full maturity.

24. About half of menstrual fluid is blood. This blood contains sodium, calcium, phosphate, iron, and chloride, the extent of which depends on the woman. As well as blood, the fluid consists of cervical mucus, vaginal secretions, and endometrial tissue.

25. Secondary oocyte proceeds to ovum if it is fertilized. The site of fertilization is uterine tube.

26. The ovaries produce eggs as well as the hormones estrogen and progesterone. Removal of one ovary still allows a woman to continue to menstruate and to have children, as long as the remaining ovary is not damaged.

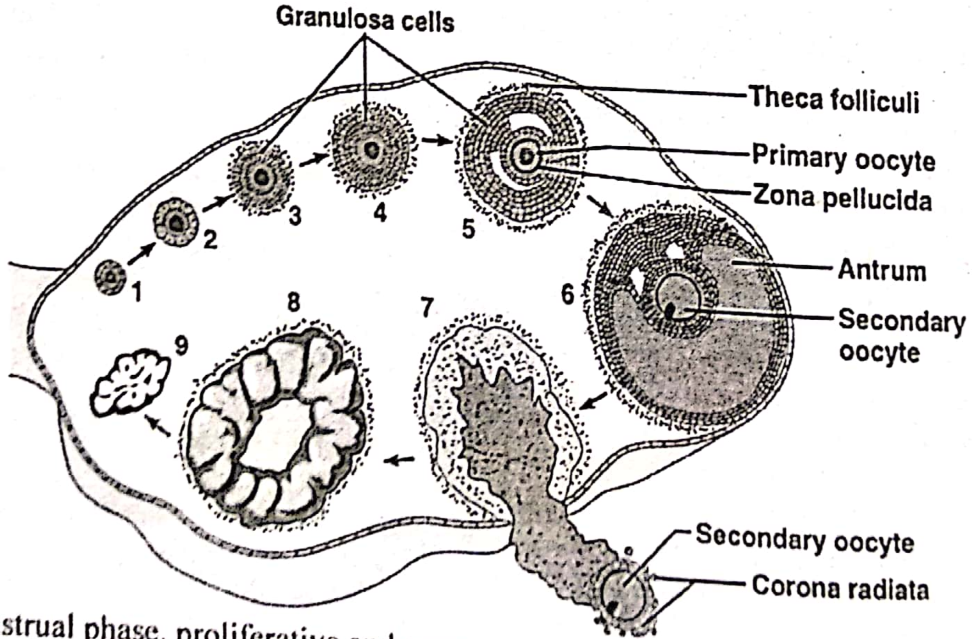
27. The menstrual cycle is governed by hormonal changes. It takes 3-7 days to regain original form of uterus for next cycle.

28. In normal menstrual cycle, ovulation usually occurs at mid cycle, i.e. 14th day.

29. A woman can have multiple ovulations in a single cycle. This means that several eggs (most often two) are released from the ovaries. However, both eggs will be released within 24h from the ovaries and result in multiple births.

30. During menstruation hormone dependent layers which developed on endometrium, released out from body.

31.

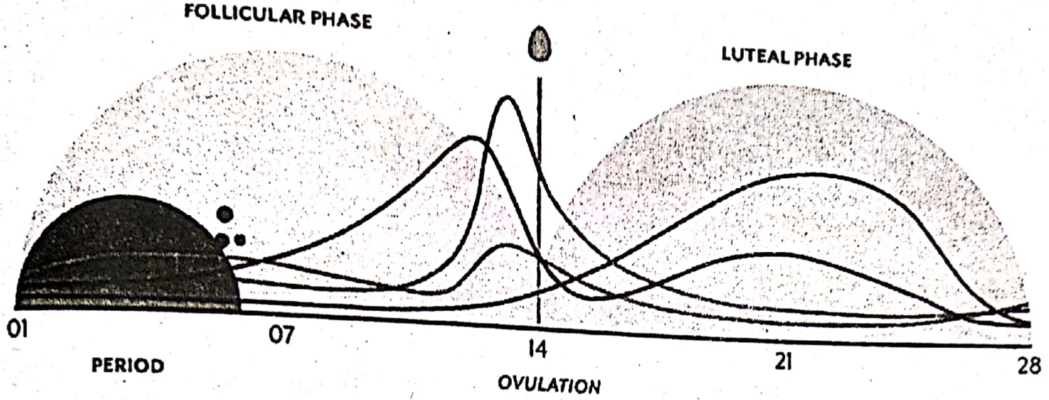


32. Menstrual phase, proliferative and secretory phases are related to uterine cycle.

33. During to stimulus of FSH more than one follicles undergo development. Single one will survive due to competition remaining will degenerate by process of follicle atresia.

34. Metrorrhagia is uterine bleeding at irregular intervals, particularly between the expected menstrual periods.

35.

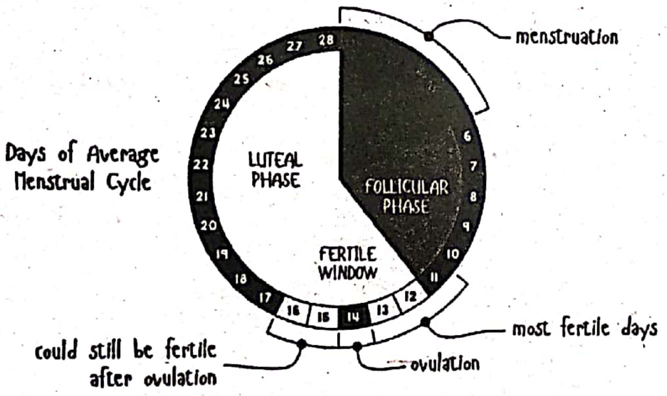


Ovarian Cycle

36. Progesterone continuous production will maintain thickness of endometrium longing which help to maintain pregnancy.

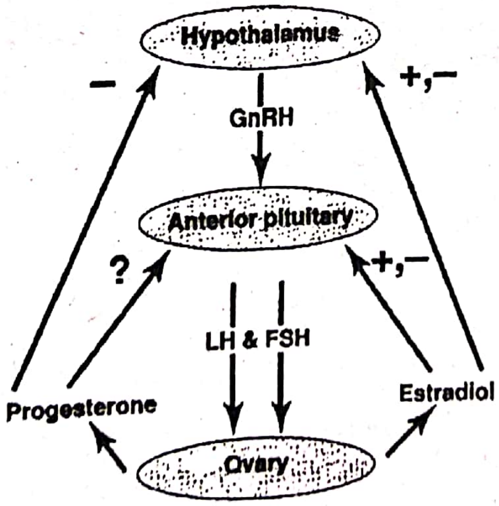
37.

Ovulation Cycle



Fertility windows and menstrual cycles vary from person to person

38.



39. Andropause is a condition that is associated with the decrease in the male hormone testosterone.
Menarche is first menstrual cycle of female.
Menstruation is first phase of menstrual cycle in which bleeding start.

40. Spermatogonium cell produced at an early stage in the formation of spermatozoa, formed in the wall of a seminiferous tubule and giving rise by mitosis to spermatocytes.

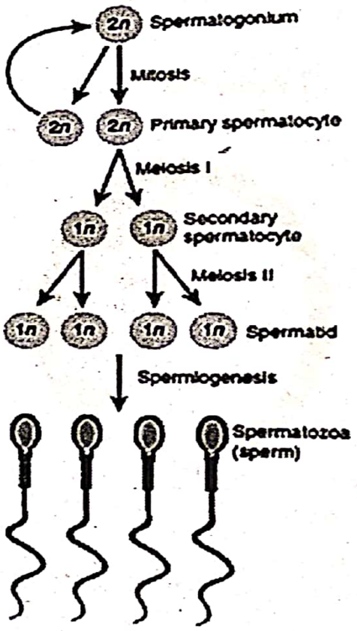
41. Leydig cells or interstitial cells are the cells present in the interstitial space of the testis. In fact, they are located in the connective tissue that surrounds the seminiferous tubules. These cells are responsible for testosterone production in male body.

42. Spermatid is spherical, non-motile cell. Through differentiation, it is changed into spermatozoa where it forms tail and becomes motile.

43. Leydig cells or interstitial cells are the cells present in the interstitial space of the testis. In fact, they are located in the connective tissue that surrounds the seminiferous tubules. These cells are responsible for testosterone production in male body.

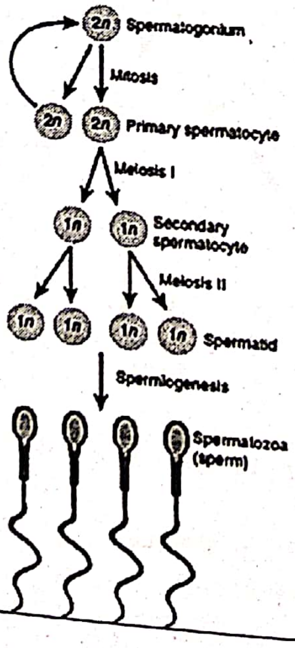
44. LH is also called as interstitial cells stimulating hormone (ICSH) which also act on interstitial cells to produce the testosterone.

45.



46. LH is also called as interstitial cells stimulating hormone (ICSH) which also act on interstitial cells to produce the testosterone.

47.



48. The follicle cells, after release of egg, are modified to form a special structure called corpus luteum. This yellowish glandular structure starts secreting progesterone, which develops endometrium and makes it receptive for implantation and placentation.

49. Pituitary gland on the onset of puberty, releases FSH which stimulates the development of several primary follicles.

50. Ovary under influence of FSH produces estrogen.

51. Secondary oocyte undergoes through meiosis II but arrested in Metaphase II. It is released in this stage from ovary and does not proceed further until fertilized.

52. The second half of the menstrual cycle after ovulation; the corpus luteum secretes progesterone which prepares the endometrium for the implantation of an embryo.

53. Events of menstrual cycle are regulated by pituitary gonadotrophins.

54. Decrease of FSH and increase of estrogen, causes the pituitary gland to secrete LH which induces ovulation.

55. Estrogen, on one hand, stimulates the endometrium and vascularizes it. On the other hand, it inhibits secretion of FSH from anterior lobe of pituitary.

56. An increase of progesterone inhibits the release of LH, because that's what normally causes progesterone to be secreted.

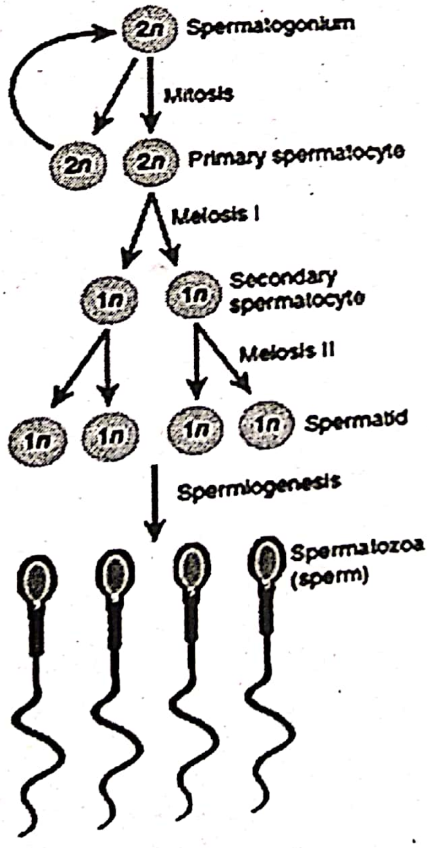
57. An increase of progesterone inhibits the release of LH, because that's what normally causes progesterone to be secreted.

58. LH causes ovulation, which results the formation of ruptured follicles known as carpus luteum which is source of progesterone.

59. Ovary under influence of FSH produces estrogen from follicle cells, which cause thickness of endometrium and stimulate LH from anterior lobe of pituitary.

60. Thickness of endometrium changes in different phases of menstrual cycle. Estrogen and progesterone make it more thick and spongy.

61.



62. Both estrogen and progesterone have supportive effect on endometrium.

63. LH causes ovulation, which results the formation of ruptured follicles known as carpus luteum which is source of progesterone.

64. After ovulation progesterone produced from corpus luteum.

65. On onset of puberty pituitary gland start FSH production which stimulate follicles development in ovary.

66. Estrogen act as inhibitor for FSH and play stimulatory role for LH, which cause ovulation.

67. A corpus luteum is a mass of cells that forms in an ovary and is responsible for the production of the hormone progesterone during early pregnancy. The role of the corpus luteum depends on whether or not fertilization occurs.

68. Menstrual cycle is the monthly cycle of changes in the ovaries and the lining of the uterus (endometrium), starting with the preparation of an egg for fertilization.

69. The menstrual cycle is regulated by hormones. LH and FSH, which are produced by the pituitary gland, promote ovulation and stimulate the ovaries to produce estrogen and progesterone.

12 TOPIC SUPPORT & MOVEMENT

PRACTICE EXERCISE

TOPIC-WISE MCQs

Q.1 **A statement not true about bones and cartilages:**
A. Both contain living cells
B. Both contain various types of living cells
C. Both have ground matrix of collagen
D. Both are part of endoskeleton

Q.2 **Which type of cartilage is/are present in our respiratory passage?**
A. Fibro cartilage
B. Elastic cartilage
C. Hyaline cartilage
D. All A, B, C

Q.3 **All of the following are true about collagen except:**
A. Inelastic
B. Flexible
C. Living
D. Protein

Q.4 **Connective tissue wrapping around a muscle that is found continuous with tendons:**
A. Perimysium
B. Endomysium
C. Epimysium
D. Perichondrium

Q.5 **Sarcoplasmic reticulum is like:**
A. Golgi bodies
B. Smooth endoplasmic reticulum
C. Cytoskeletal fibers
D. Ribosome

Q.6 **Irregular striations and involuntary control is related to:**
A. Smooth muscle cells
B. Cardiac muscle cells
C. Skeletal muscle cells
D. Fibroelastic cartilage cells

Q.7 **Which one of the following is correct regarding ligaments and tendons?**
A. Both are inelastic
B. Both are specialized connective tissue fibrils
C. Both are elastic
D. Both form joint capsule

Q.8 **Brachioradialis:**
A. Originates from radius
B. Originates from ulna
C. Is inserted into radius
D. Is inserted into ulna

Q.9 **The main functional partners of bones are:**
A. Tendon
B. Ligament
C. Skeletal muscle
D. Nerves

Q.10 **Sarcolemma is primarily made up of:**
A. Lipoprotein
B. Glycolipids
C. Glycoprotein
D. Nucleoproteins

Q.11 **Earliest form of muscles is:**
A. Cardiac
B. Skeletal
C. Smooth
D. Striated

Q.12 **Which one of the following structures serves as a center of sarcomere?**
A. H-Zone
B. Z-band
C. M-line
D. A-band

Q.13 **Which one of the following is correct regarding A-band?**
A. It is non-polarizing
B. It contains only myosin
C. It is isotropic
D. Myosin acts as a polarizer of light

Q.14 **Cross bridges form between:**
A. Troponin and tropomyosin
B. Actin filaments and myosin heads
C. Calcium and sodium
D. Sarcolemma and sarcoplasmic reticulum

Q.15 When a muscle is at rest, what blocks myosin from binding to actin?
[✓ A. Tropomyosin]
B. Tubulin
C. Troponin
D. Sarcomere

Q.16 Which triggers the release of calcium ions from sarcoplasmic reticulum?
A. Formation of actin-myosin cross bridges
[✓ B. An action potential]
C. Sarcomere contraction
D. An increase in calcium ion concentration

Q.17 T-tubules in human skeletal muscles are present at:
A. Z-line
B. M-line
[✓ C. A-I junction]
D. H-zone

Q.18 Diameter of each myofibril is ______.
[✓ A. 2μm]
B. 10μm
C. 100 nm
D. 100μm

Q.19 Which of the following is a true statement?
A. Muscle cell has many muscle fibers
B. Muscle fiber has many muscle cells
[✓ C. Muscle cell has many myofibrils]
D. Sarcomere has bundles of muscle fibers

Q.20 Which of the following band allows most of the light to pass through it?
A. A-band
B. Muscle bundle
[✓ C. I-band]
D. Muscle fiber

Q.21 A protein that is complex of three polypeptide chains is:
A. Actin
B. Tropomyosin
C. Myosin
[✓ D. Troponin]

Q.22 Chief component of thin filaments is:
[✓ A. Actin]
B. Troponin
C. Myosin
D. Fibrous proteins

Q.23 The sliding protein of muscle:
A. Tubulin
B. Myoglobin
C. Myosin
[✓ D. Actin]

Q.24 The point of attachment of the nerve to the muscle is called a ________ junction.
[✓ A. Neuro-muscular]
B. Mechanical
C. Chemical
D. Synaptic

Q.25 All of the following are true regarding muscle contraction except:
A. I band shortens
B. A band remains unchanged
C. Z-lines gets closer
[✓ D. M-line disappears]

Q.26 Contractile protein of skeletal muscle cells involving ATPase activity is:
A. Actin
[✓ B. Myosin]
C. Troponin
D. Tropomyosin

Q.27 When muscle contracts, thick and thin filaments undergo:
[✓ A. Overlapping]
B. Shortening
C. Lengthening
D. Contraction

Q.28 A motor unit is made up of:
A. All the muscle fibers within a given muscle
[✓ B. A motor neuron and the muscle fibers it innervates]
C. All the neurons going into an individual section of a body
D. A fascicle and a nerve

Q.29 It acts as immediate source of energy for muscles contraction:
[✓ A. ATP]
B. Phosphocreatine
C. Fatty acids
D. Glycogen

Q.30 **Knee and elbow joints are examples of:**
A. Ball and socket joint
B. Cartilaginous joint
[✓ C. Hinge joint]
D. Fibrous joint

Q.31 **Which of the following is an example of synovial joint?**
A. Joint between clavicle and scapula
[✓ B. Joint between radius and ulna]
C. Joint between rib and vertebral column
D. Joints between skull bones

Q.32 **The joint present between the bones of forearm and wrist is called as:**
A. Pivot joint
[✓ B. Multistage joint]
C. Ball and socket joint
D. Hinge joint

Q.33 **Elbow joint is an example of:**
A. Ball and socket joint
B. Fibrous joint
[✓ C. Hinge joint]
D. Pivot joint

Q.34 **Acute forms of arthritis usually results from _____ invasion.**
A. Viral
B. Fungal
[✓ C. Bacterial]
D. Bacteriophage

PAST PAPER MCQs

Q.35 **The repeated protein pattern of myofibrils is called:** **(MDCAT 2014)**
[✓ A. Sarcomere]
B. Sarcolemma
C. Zyomere
D. Cross bridges

Q.36 **A sarcomere is the region of a myofibril between two successive:** **(MDCAT 2015)**
A. M-lines
B. I-bands
[✓ C. Z-lines]
D. T-tubules

Q.37 **The sarcolemma of muscle fiber folds inwards and forms a system of tubes which runs through the sarcoplasm called:** **(MDCAT 2015)**
A. Myofilaments
B. Z-lines
C. Sarcoplasmic reticulum
[✓ D. Transverse tubules]

Q.38 **According to sliding filament theory, when muscle fibers are stimulated by nervous system, which of the following changes occurs?** **(MDCAT 2015)**
[✓ A. I-bands shorten]
B. Z-lines move further apart
C. H-zone becomes more visible
D. A-bands shorten

Q.39 **Each muscle fiber is surrounded by a modified cell membrane called:** **(MDCAT 2016)**
[✓ A. Sarcolemma]
B. Myosin Filament
C. Sarcomere
D. Myofilament

Q.40 **Each muscle fiber is surrounded by a modified cell membrane called:** **(MDCAT 2017)**
[✓ A. Sarcolemma]
B. Myosin Filament
C. Sarcomere
D. Myofilament

Q.41 **Over lapping of thick filament occurs in:** **(MDCAT 2017)**
[✓ A. A-Band]
B. M-line
C. I-Band
D. Z-line

Q.42 **Sarcolemma is the membrane around?** **(ETEA 2017)**
A. Bone
B. Joints
[✓ C. Muscle fiber]
D. Heat

Q.43 **Thin filaments of muscles contain _____ chains of actin molecules.** **(MDCAT 2019)**
A. Four
B. Three
C. One
[✓ D. Two]

Q.44 **The thick filaments in a myofibril of muscles are made up of ________.** **(MDCAT 2019)**

A. Haemoglobin
B. Actin
C. Myoglobin
[✓ D. Myosin]

Q.45 **The function of calcium ions in muscle contraction is to:** **(MDCAT 2019)**

[✓ A. Bind to troponin molecule and cause them to move]
C. Aid in the transmission of nerve impulse
B. Polarize visible light
D. Bind to tropomyosin molecule and cause them to form cross bridges

Q.46 **Each muscle fibre contains long threads that extend along its entire length. These are called as:** **(AJK 2019)**

A. Myosin
B. Microtubules
C. Microfilaments
[✓ D. Myofibrils]

Q.47 **The microtubules in the cytoskeleton are made up of protein:** **(AJK 2019)**

A. Tropomyosin
B. Myosin
[✓ C. Tubulin]
D. Actin

Q.48 **The functional unit of a muscle is known as ________.** **(AJK 2019)**

[✓ A. Sarcomere]
B. Sarcoplasmic reticulum
C. Sarcoplasm
D. Sarcolemma

Q.49 **The type of muscle which exhibits striations at regular intervals, is multinucleate and whose control is neurogenic (controlled by the nervous system) is the:**

A. Smooth muscle
B. Cardiac muscle
[✓ C. Skeletal muscle]
D. Involuntary muscle

Q.50 **Which one of the following muscles are considered as "Voluntary muscles"?** **(PMC 2020)**

A. Smooth muscles
[✓ B. Skeletal muscles]
C. Cardiac muscles
D. Glandular muscles

Q.51 **Which one of the following are "myogenic" type of muscles?** **(PMC 2020)**

A. Smooth muscles
B. Skeletal muscles
[✓ C. Cardiac muscles]
D. Glandular muscles

Q.52 **What do we call the cell surface membrane of a muscle fiber?** **(PMC 2020)**

[✓ A. Sarcolemma]
B. Sarcoplasm
C. Plasma membrane
D. Myofibrils

ANSWER KEY

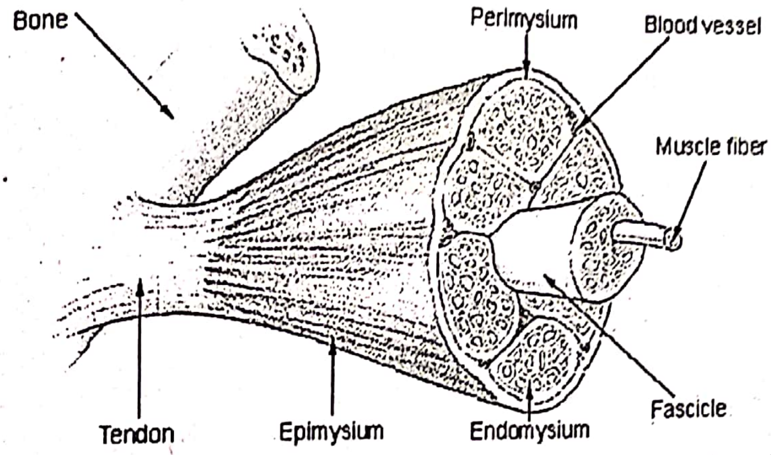
TOPIC-WISE MCQs PAST PAPER MCQs

1	B	11	C	21	D	31	B	41	A	51	C
2	C	12	C	22	A	32	B	42	C	52	A
3	B	13	D	23	D	33	C	43	D		
4	C	14	B	24	A	34	C	44	D		
5	B	15	A	25	D	35	A	45	A		
6	B	16	B	26	B	36	C	46	D		
7	B	17	C	27	A	37	D	47	C		
8	C	18	A	28	B	38	A	48	A		
9	C	19	C	29	A	39	A	49	C		
10	A	20	C	30	C	40	A	50	B		

EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

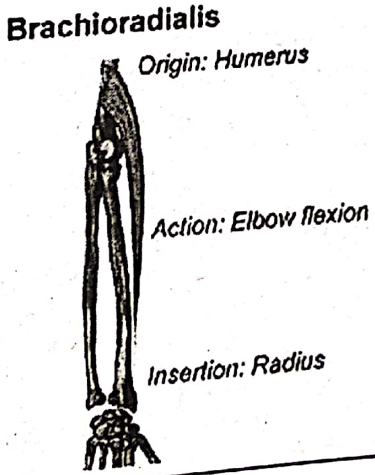
1. Bones have living tissues like osteoblast, osteocytes and osteoclast, while cartilage have chondrocytes that produce large amount of collagenous extracellular matrix.
2. Fibrocartilage present in intervertebral disc.
Elastic cartilage present in ear pinna, epiglottis.
Hyaline cartilage is found at the end of long bones and in the nose, at larynx and trachea
3. Collagen is the most abundant protein in your body. It is the major component of connective tissues that make up several body parts, including tendons, ligaments, skin, and muscles
4. Anatomy of muscle bundle is given below:



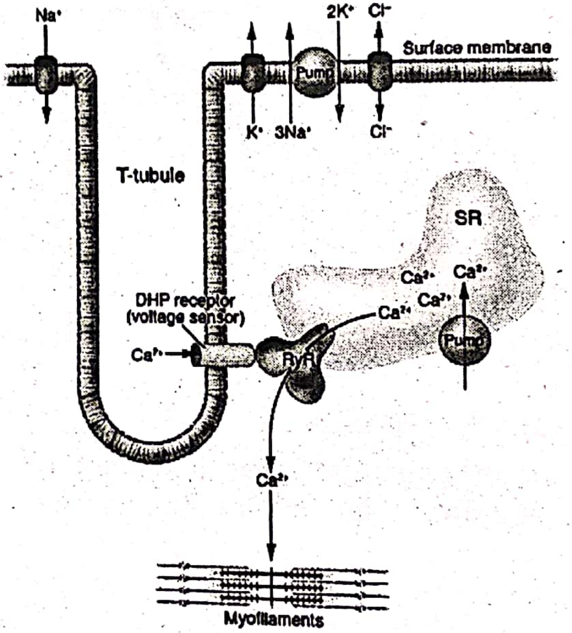
5. Sarcoplasmic reticulum is the modified form of smooth endoplasmic reticulum as they devoid of ribosomes and found in muscles. It regulates Ca^{2+} ions concentration in sarcoplasm.
6. Skeletal muscle cells have regular striation, while smooth muscle cells do not have striation. Cardiac muscle cells, however, have irregular striations with involuntary control.
7.

Tendon	Ligament
Inelastic, tough fibrous tissue	Strong, elastic fibrous tissue
Connects bone with muscle	Connects bone with bone (form joint)

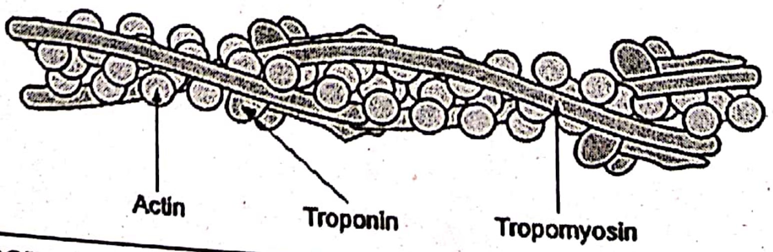
8.



9. The main functional partner of bones is skeletal muscles. Both these can work together to bring about movement in the body.
10. Since sarcolemma is the membrane of muscle cells, so its chemical composition is lipoproteins.
11. Smooth muscles are found both in invertebrates and vertebrates while cardiac and skeletal muscles are found only in vertebrates and are most developed
12. A sarcomere is bounded by two Z-lines and its center is bisected by dark line called M line.
13. Each dark band in the skeletal muscles is called A-band because it is anisotropic i.e. it can polarize visible light. This polarization of light is due the presence of myosin. It also contains overlapping actin.
14. When muscles contract myosin heads attach to the actin.
15. When the muscle is at rest, the tropomyosin is disposed in such a way that it covers the sites on the actin chain where the head of myosin becomes attached.
16.



17. T tubule is found at A-I junction in skeletal muscle while at Z-line in cardiac muscle.
18. Diameter of myofibrils is 2μm.
19. When viewed in high magnification, each muscle fiber is seen to contain large number of myofibrils 1-2μm in diameter that run in parallel fashion and extend entire length of the cell.
20. Isotropic bands contain only actin-containing thin filaments. They indicate the behavior of polarized light as it passes through I bands. These are with low refractive index thus appears brighter.
21. Thin filament contains three types of protein; actin (having 2 polypeptide chains), tropomyosin (having 2 polypeptide chains) and troponin (having 3 polypeptide chains).
22. Most abundant protein in thin filament is actin, while most abundant protein found in thick filaments is myosin.
23.

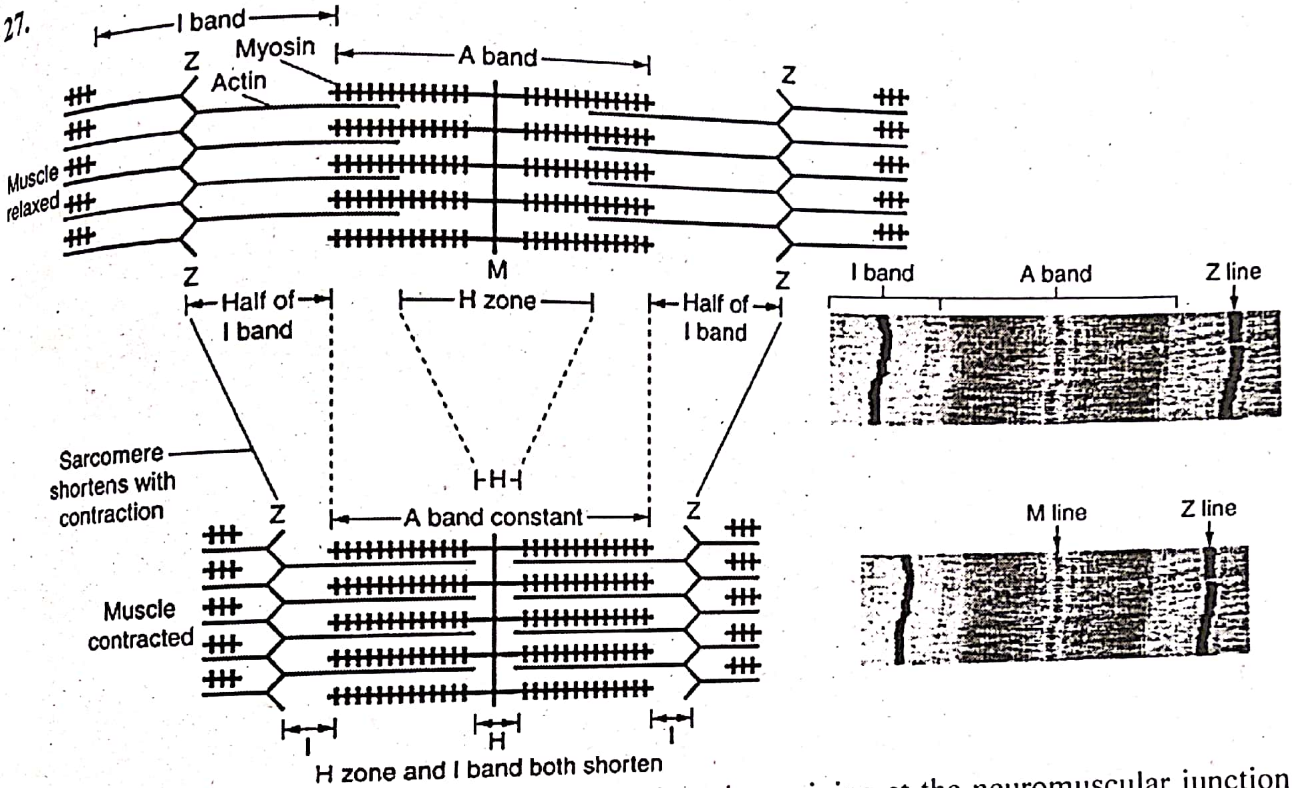


24. The point of attachment of the nerve to the muscle is called neuromuscular junction. All the fibres innervated by a single motor neuron are a motor unit and contract simultaneously in response the action potential fired by motor neurons.

25. During muscle contraction, I-band shortens, Z-lines get closer to each other and H-zone disappears. A-band and M- line remains unchanged.

26. In muscle, myosin is found abundantly. Its head region has ATPase activity and involves in ATP hydrolysis during muscle contraction.

27.



28. Muscle contraction is initiated by nerve impulse arriving at the neuromuscular junction. All the fibres innervated by a single motor neuron are a 'motor unit' and contract simultaneously in response to the action potential fired by the motor neurons.

29. ATP is energy currency which radially available for cellular working

30. A hinge joint is a bone joint in which the articular surfaces are molded to each other in such a manner as to permit motion only in one plane. Ball and socket joint shows movement in all directions.

31. A synovial joint is the type of joint found between bones that move against each other, such as the joints of the limbs (e.g. shoulder, hip, elbow and knee).

32.

Joint	**Examples**
Pivot joint	Between proximal end of radius and ulna
Ball and socket	Pelvic and pectoral girdle
Hinge joint	Knee and elbow

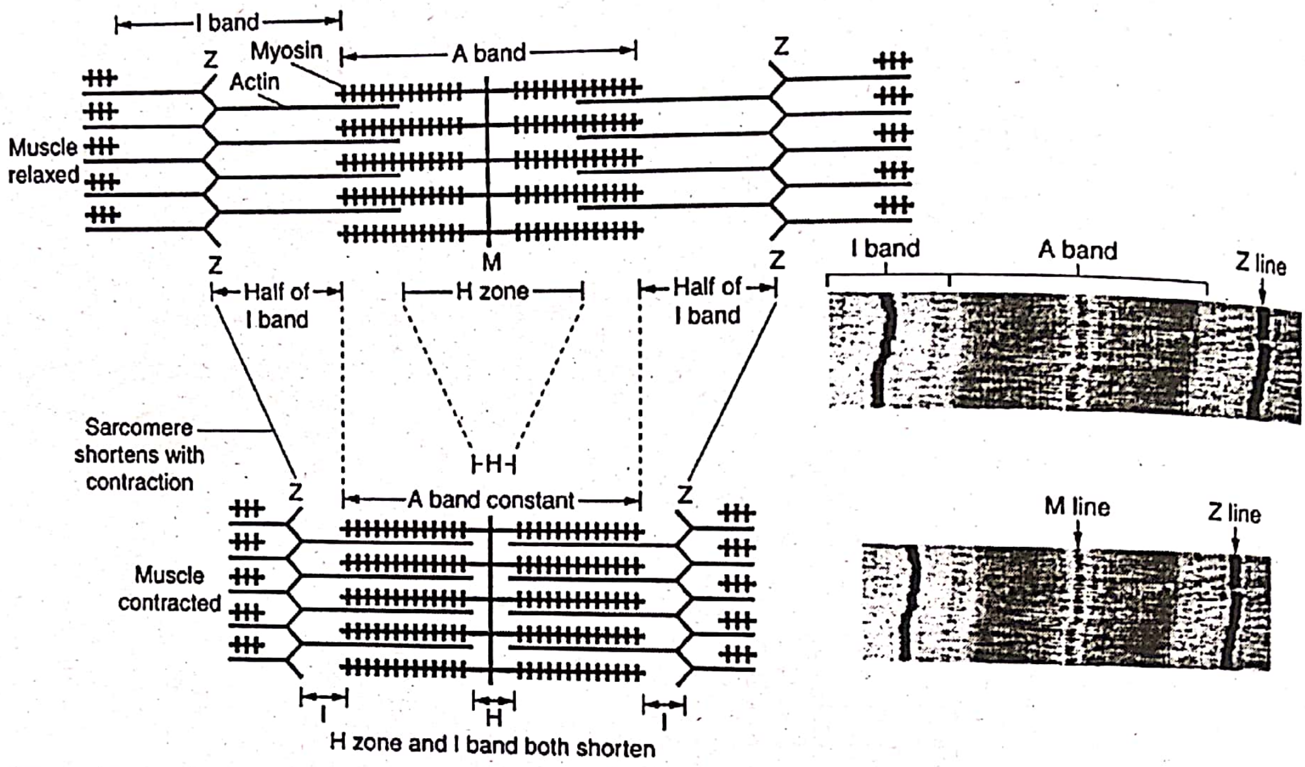
33.

Joint	**Examples**
Pivot joint	Between proximal end of radius and ulna
Ball and socket	Pelvic and pectoral girdle
Hinge joint	Knee and elbow

34. Bacterial invasions during the arthritis can cause acute forms of inflammation.

35. A myofibril is a basic rod-like unit of a muscle cell. The repeated protein pattern of myofibrils is called sarcomere and it is the complicated unit of striated muscle tissue. It is the repeating unit between two Z-lines.

36.



37. T-tubules are extensions of the cell membrane that penetrate into the centre of skeletal and cardiac muscle cells. The function of T-tubules is to conduct impulses from sarcolemma down into the cell and specifically, to another structure in the cell called sarcoplasmic reticulum.

38. According to sliding filament model of muscle contraction, the following changes can occur

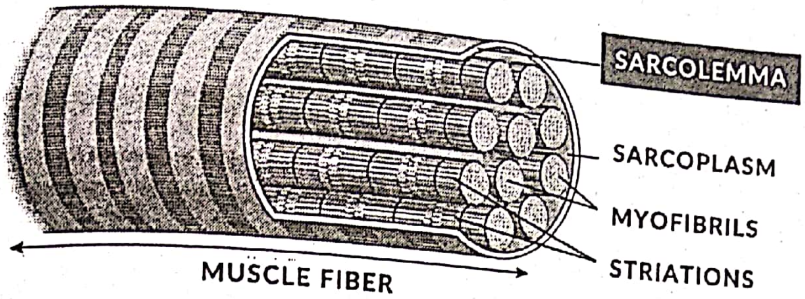
- Z-lines come brought closer together
- I-band shortens
- H-zone disappears

39. The sarcolemma is a specialized cell membrane which surrounds striated muscle fiber cells. The sarcolemma is similar to a typical plasma membrane but has specialized functions for the muscle cell.

40. The sarcolemma is a specialized cell membrane which surrounds striated muscle fiber cells. The sarcolemma is similar to a typical plasma membrane but has specialized functions for the muscle cell.

41. Thick filaments occur only in the A band of a myofibril. The region at which thick and thin filaments overlap has a dense appearance, as there is little space between the filament. Thin filaments do not extend all the way into the A bands, leaving a central region of the A band that only contains thick filaments.

42.

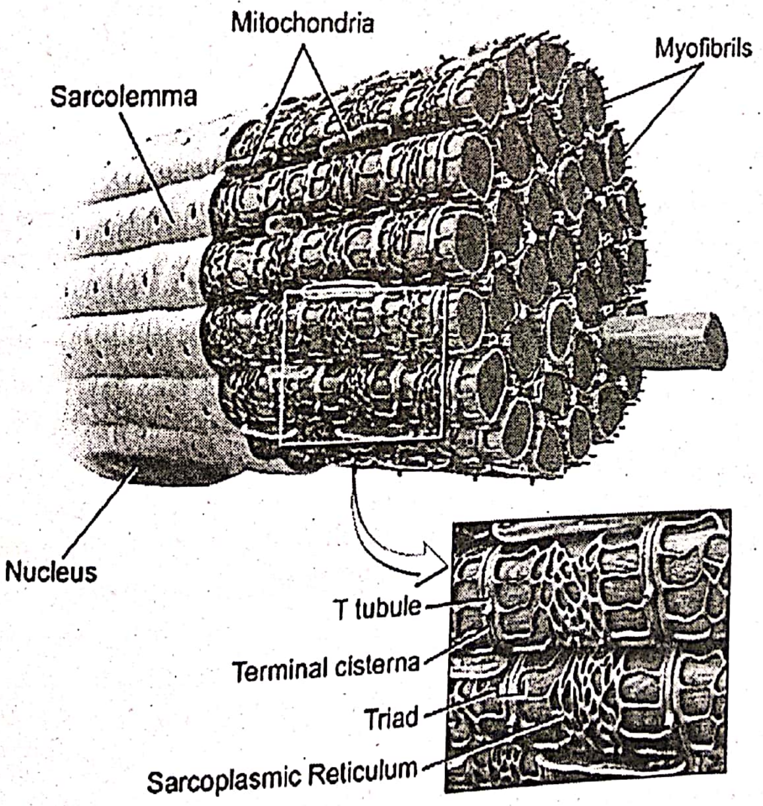


43. Actin is a spherical protein that forms the thin filament in muscle cells. Thin filaments are composed of two long chains of these actin molecules that are twisted around one another. Each actin molecule has a myosin-binding site where a myosin head can bind

44. Thick filaments composed of several hundred molecules of myosin. A myosin molecule is shaped like a golf club, with a tail formed of two intertwined chains and a double globular head projecting from it.

45. Inside the muscle, Ca^{2+} facilitates the interaction between actin and myosin during contractions. Calcium binds with the troponin, causing a position change in tropomyosin, exposing the actin sites that myosin will attach to, for a muscle contraction.

46.



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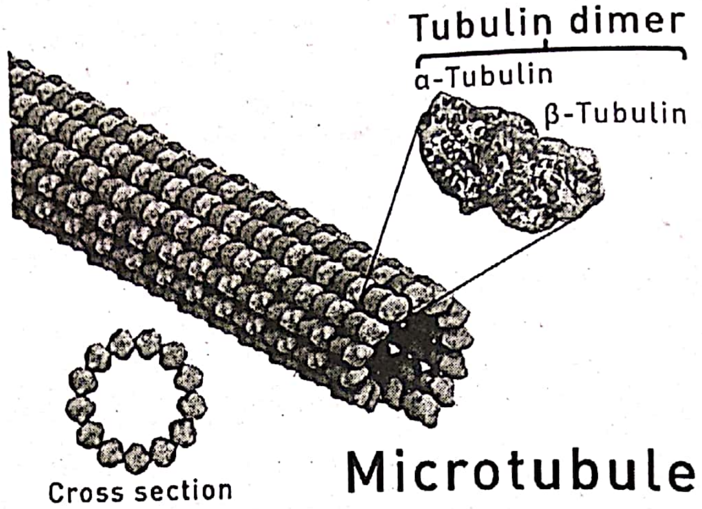

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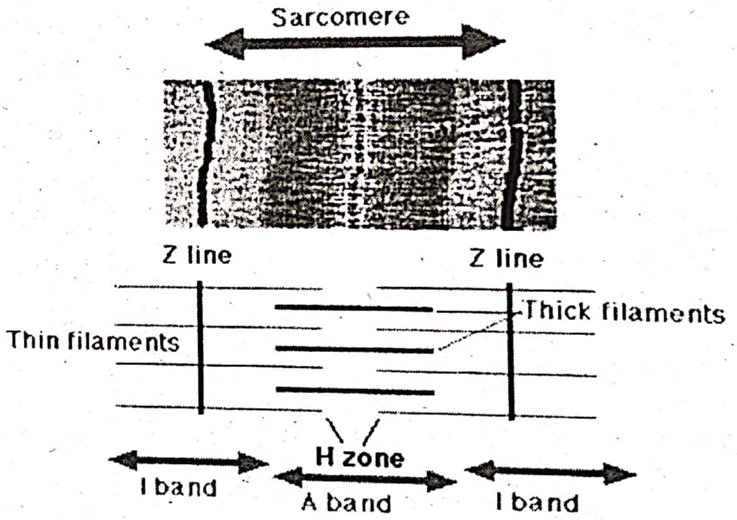


49. Cardiac muscles are muscles with irregular striations and involuntary in their action.

50. Cardiac and smooth muscles are involuntary in action, while skeletal muscles are voluntary in their functions.

51. The muscles of the human heart are stimulated to contract by nerve impulses generated by the Sino Atrial (SA. Node). It is a cluster of cells which are part of the heart muscle. Hence the human heart is myogenic. It does not require nerves to start contracting, it can contract on its own.

52. The sarcolemma also called the myolemma, is the cell membrane of a striated muscle fiber cell. It consists of a lipid bilayer and a thin outer coat of polysaccharide material (glycocalyx) that contacts the basement membrane.

13 TOPIC VARIATION & GENETICS / INHERITANCE

PRACTICE EXERCISE

TOPIC-WISE MCQs

Q.1 The alleles are:

A. A pair of genes governing a specific character
B. Genes governing eye characters
[✓ C. Multiple forms of genes]
D. Genes present on allosomes

Q.2 An organism's genetic constitution is called its:

[✓ A. Genotype]
B. Genetics
C. Phenotype
D. Gene pool

Q.3 All the genes/alleles found in a breeding population at a given time are collectively termed as:

A. Genome
[✓ B. Gene pool]
C. Genotype
D. Karyotype

Q.4 An allele is said to be dominant if:

A. It is expressed only in heterozygous combination
B. It is expressed only in homozygous combination
[✓ C. It is expressed in both homozygous and heterozygous condition]
D. It is expressed only in second generation

Q.5 An organism with two identical alleles for a given trait is:

[✓ A. Homozygous]
B. Dominant
C. Heterozygous
D. Hermaphrodite

Q.6 In Mendel's experiment, nature of seed coat, flower colour, position of flower, pod colour, stem height, etc., are referred as:

A. Alleles
[✓ B. Phenotypes]
C. Genotypes
D. Karyotype

Q.7 The dwarfness in plants of F_2 generation is due to:

[✓ A. Homozygous recessive alleles]
B. Homozygous dominant alleles
C. Heterozygous dominant alleles
D. Heterozygous recessive alleles

Q.8 In Mendel's experiments, the phenotypic ratio of recessive to dominant plants was equal to:

[✓ A. 1:3]
B. 3:9
C. 3:1
D. 9:3

Q.9 In Mendelism, the linkage was not observed due to:

A. Mutation
B. Synapsis
[✓ C. Independent assortment]
D. Crossing over

Q.10 A cross between plants having RRYY and rryy composition will yield plants with:

[✓ A. Round and yellow seeds]
B. Wrinkled and yellow seeds
C. Round and green seeds
D. Wrinkled and green seeds

Q.11 A cross between a homozygous recessive and a heterozygous plant is called:

A. Monohybrid cross
[✓ B. Test cross]
C. Dihybrid cross
D. Back cross

Q.12 Self-cross between Tt and Tt plants results into the genotype ratio of:

A. 3:1
B. 1:3
[✓ C. 1:2:1]
D. 4:0

Q.13 **When a tall plant with rounded seeds (TTRR) is crossed with a dwarf plant with wrinkled seeds (ttrr), then the generation consists of tall plants with rounded seeds. How many types of gametes a plant would produce?**

[✓ A. One] B. Four

C. Three D. Eight

Q.14 **In Mendelian dihybrid cross, how many of progeny in F_2 generation possess genotype rryy?**

[✓ A. $\frac{1}{16}$] B. $\frac{3}{16}$

C. $\frac{2}{16}$ D. $\frac{4}{16}$

Q.15 **In the dihybrid cross, the number of round green seeds that were homozygous for round trait:**

A. 2 [✓ B. 1]

C. 3 D. 4

Q.16 **Inheritance of ABO blood group system is an example of:**

[✓ A. Multiple allelism] B. Co-dominance

C. Complete dominance D. Gene linkage

Q.17 **Multiple alleles are the altered forms of a gene whose number is more than two and may have as many as 300 alleles, but a diploid organism can:**

A. Have just one of them in its genome B. Have four of them in its genome

[✓ C. Have two of them in its genome] D. Have multiple of them in its genome

Q.18 **In humans, the polymorphic gene 'I' has three multiple alleles which are the result of:**

A. Complete dominance [✓ B. Mutation]

C. Sex linkage D. Gene linkage

Q.19 **The genotype of blood group 'A' can be:**

A. I^AI^A [✓ B. I^AI^A or I^AI^O]

C. I^BI^B D. I^AI^O

Q.20 **A person with antigens 'B' present of membrane of RBCs and 'anti-A' antibodies in the blood plasma will have:**

A. Blood group 'A' B. Blood group 'AB'

[✓ C. Blood group 'B'] D. Blood group 'O'

Q.21 **If a female has 'A' blood group and her husband has 'O' blood group, then the blood group of their children possibly be:**

A. A and B groups only [✓ B. A and O groups only]

C. AB only D. All four groups

Q.22 **ABO blood grouping is controlled by gene I which has three alleles and show co-dominance. There are six genotypes. How many phenotypes are possible?**

A. Six [✓ B. Four]

C. Three D. Five

Q.23 **Which of the following blood groups is not possible in a person whose father is of blood group O?**

[✓ A. AB] B. B

C. A D. O

Q.24 **A man having a blood group O marries a woman having a blood group A whose father was also O. What is the probability of 'O' in their offspring?**

[✓ A. 50%]
B. 75%
C. 25%
D. 0%

Q.25 **Which of the following blood group is considered as universal donor?**

A. AB^{+ve}
[✓ B. O^{-ve}]
C. AB^{-ve}
D. O^{+ve}

Q.26 **Blood group antigens can be found in:**

A. RBCs
B. Body fluids
C. Saliva
[✓ D. ALL A, B, C]

Q.27 **Rh factor is named after:**

A. Man
[✓ B. Monkey]
C. Rat
D. Chimpanzee

Q.28 **Which of the following is genetically dominant in man?**

A. Colour blindness
B. Haemophilia
[✓ C. Rh positive]
D. Albinism

Q.29 **Rh factor may be responsible for:**

A. Turner's syndrome
B. Sickle-cell anaemia
C. AIDS
[✓ D. Erythroblastosis fetalis]

Q.30 **Which of the following will not result in variations among siblings?**

A. Independent assortment of genes
[✓ B. Linkage]
C. Crossing over
D. Mutation

Q.31 **All of the following can form a linkage group on human chromosome 11 except:**

[✓ A. Gout]
B. Albinism
C. Sickle cell anemia
D. Leukemia

Q.32 **The recombination frequency is 20% between the two genes. The distance between them in unit map is:**

[✓ A. 20]
B. 60
C. 30
D. 80

Q.33 **Genes A, B, C, and D are located on the same chromosome. The recombination frequencies (RF) are as follows:**

Relationship	RF
A-B	8%
A-C	23%
A-D	19%
B-C	10%
C-D	52%

What is the most likely order of the genes on the chromosome?

A. BCAD
B. CBAD
C. ACBD
[✓ D. DBAC]

Q.34 **Drosophila has four pairs of chromosomes. How many linkage groups does it have?**

A. Eight
B. One less than the pairs of chromosomes
[✓ C. Four]
D. One more than the pairs of chromosomes

Q.35 **Which of the following is not a genetic disorder?**

A. Hemophilia
B. Colour blindness
C. Phenylketonuria
[✓ D. Epilepsy]

Q.36 Example of X-linked dominant trait is:
A. Hemophilia A
B. Tritanopia
C. Hemophilia B
[✓ D. Hypophosphatemia]

Q.37 All of the following are non-allelic X-linked traits except:
A. Hemophilia A
[✓ B. Hemophilia C]
C. Hemophilia B
D. TFM syndrome

Q.38 Which is not related to color blindness?
A. Zigzag pattern of inheritance
[✓ B. Passes directly from father to son]
C. Rhodopsin
D. More common in men

Q.39 Regarding color blindness when a normal male marries a carrier female, which is the correct statement?
A. All daughters will be color blind
B. All daughters will be carriers
C. All sons will be color blind
[✓ D. Half of the sons will be color blind]

Q.40 What is the probability of a hemophilic daughter of a normal man whose father was hemophilic and a carrier woman?
[✓ A. 0%]
B. 50%
C. 25%
D. 75%

PAST PAPER MCQs

Q.41 Position of a gene within a DNA molecule is: **(MDCAT 2014)**
[✓ A. Locus]
B. Amplicon
C. Origin
D. Filial

Q.42 ABO blood system is an example of: **(MDCAT 2015)**
A. Polygenes
[✓ B. Multiple alleles]
C. Multiple genes
D. Multiple mutation

Q.43 Number of pairs of autosomes in humans is: **(MDCAT 2015)**
A. 23
B. 21
C. 24
[✓ D. 22]

Q.44 X-linked recessive trait is: **(MDCAT 2015)**
A. Hypophosphatemia
[✓ B. Haemophilia]
C. Vitamin-D resistant rickets
D. Diabetes mellitus

Q.45 Mendel concluded that each organism has two hereditary factors for each trait, now called: **(SMBBMC 2015)**
A. Chromatids
[✓ B. Alleles]
C. Chromosomes
D. none of the above

Q.46 The total number of genes in a population is called: **(MDCAT 2016)**
[✓ A. Gene pool]
B. Genome
C. Allele pool
D. Genomic library

Q.47 A character determined by three alleles is: **(MDCAT 2016)**
A. Human skin color
B. Human eye color
[✓ C. Human blood group]
D. Human Rh factor

Q.48 Which one of the following is X-linked trait? **(MDCAT 2016)**
A. Male pattern baldness
[✓ B. Haemophilia]
C. Diabetes mellitus
D. Erythroblastosis foetalis

Q.49 Locus stands for: **(MDCAT 2017)**
[✓ A. Position of gene on homologous chromosomes]
B. Regions of chromosomes
C. Position of an allele within a DNA molecule
D. Close regions of same chromosomes

Q.50 **Self-fertilization of F1 dihybrids, following independent assortment of alleles will result in:** **(MDCAT 2017)**
A. 3/16 tall, round: 3/16 dwarf, wrinkled
B. 9/16 tall, round: 1/16 3/16dwarf, round
C. 9/16 tall, wrinkled: 3/16dwarf, round
[✓ D. 3/16 tall, wrinkled: 3/16 dwarf, round]

Q.51 **As a result of cross-fertilization of true breeding pea plant having purple colored flowers with that of white colored flowers, the offspring will have flower with:** **(MDCAT 2017)**
A. ¼ purple and ¾ white
B. All white
C. ¼ white and ¾ purple
[✓ D. All purple]

Q.52 **The gene for red-green color blindness is present on:** **(MDCAT 2017)**
A. Y–chromosome
B. Autosome No. 7
[✓ C. X–chromosome]
D. Autosome No.9

Q.53 **The region of the chromosome or more specifically, a length of the DNA molecule, which has a particular nucleotides sequence that codes for specific protein, is called ________.** **(MDCAT 2018)**
A. Locus
B. Allele
[✓ C. Gene]
D. Kinetochore

Q.54 **________ is the exact position of a gene on the chromosome.** **(MDCAT 2018)**
A. Genotype
B. Centromere
[✓ C. Locus]
D. Trait

Q.55 **Which one of the following is multiple allelic character?** **(MDCAT 2018)**
A. Length of stem in pea plant
[✓ B. Blood group of the human being]
C. Shape of seed in pea plant
D. Colour of flower in pea plant

Q.56 **There are__________ number of linkage groups in human.** **(MDCAT 2018)**
A. 22
B. 46
[✓ C. 23]
D. 80

Q.57 **Chance of a cross over between two loci is directly proportional to their:** **(MDCAT 2018)**
A. Length
B. Width
[✓ C. Distance]
D. Thickness

Q.58 **Homozygous means:** **(MDCAT 2019)**
[✓ A. Having two identical alleles of a gene]
B. Alleles in an organism
C. Having two identical genes
D. Two different alleles of a gene

Q.59 **In genetics, the term locus refers to the ________ of the gene on the chromosome.** **(MDCAT 2019)**
A. Frequency
[✓ B. Position]
C. Copy
D. Inversion

Q.60 **A person was married to his cousin and both are heterozygous for sickle cell anemia. Among their four kids, what will be proportion of affected homozygotes?** **(MDCAT 2019)**
A. 50%
B. 75%
[✓ C. 25%]
D. 100%

Q.61 **In which situation, genes are not assorted independently during meiosis in a chromosome?** **(MDCAT 2019)**
A. When genes are not linked and their loci are far apart
B. When there are too many genes on a chromosome
C. When some genes have mutated on the chromosome
[✓ D. When genes are linked and their loci are close to each other]

Q.62 **If a carrier haemophilic female (XHXh) is married to a haemophilic male (XhY). What will be the ratio of presence of haemophilia in the children? Select best answer from given condition XHXhXhY.** **(MDCAT 2019)**

A. 100% all females and males will be haemophiliac

[✓ B. Carrier female 25% haemophilic female 25%, 25% normal male and 25% haemophilic male]

C. Females and males both have 50% chances to getting haemophilia

D. Females have 50% chances of getting haemophilia and females will be 100% haemophilic.

Q.63 **If Sara has blood group O. The genotype of her mother and father is possibly:** **(AJK 2019)**

A. Bi X BB

B. BB X BB

[✓ C. Bi X Bi]

D. BB X Bi

Q.64 **Which situation can reduce the chances of variation and genetic recombination?** **(AJK 2019)**

A. Random fusion of gametes

B. Crossing over

[✓ C. Gene linkage]

D. Mutation

Q.65 **During crossing over, exchange of segments takes place between:** **(AJK 2019)**

A. Sister chromatids of homologous chromosomes

[✓ B. Non-sister chromatids of homologous chromosomes]

C. Non-sister chromatids of non-homologous chromosomes

D. Sister chromatids of non-homologous chromosomes

Q.66 **Human height is an example of continuously varying trait controlled by:** **(AJK 2019)**

A. Single gene and environment

B. Single gene with multiple alleles

C. Single gene

[✓ D. Multiple gene and environment]

Q.67 **How many pairs of homologous chromosomes are present in Pisum sativum?** **(ETEA 2019)**

[✓ A. Seven pairs]

B. Eight pairs

C. Nine pairs

D. Ten pairs

Q.68 **Hemophilia is a sex linked __________ trait.**

A. Dominant

B. Codominant

C. Pleiotropic

[✓ D. Recessive]

Q.69 **Haemophilia A and B, color blindness and testicular feminization are example of:** **(PMC 2020)**

A. X linked dominant trait

B. Y linked inheritance

[✓ C. X linked recessive trait]

D. Pseudoautosomal trait

Q.70 **Which traits are most likely to affect men than women?** **(PMC 2020)**

[✓ A. X - linked recessive]

B. Autosomal dominant

C. X - linked dominant

D. Autosomal recessive

Q.71 **When both the alleles of a gene pair are same, the organism is said to be:** **(PMC 2020)**

A. Heterozygous

[✓ B. Homozygous]

C. Genotype

D. Phenotype

Q.72 **Law of independent assortment States:** **(PMC 2020)**

A. That each pair of alleles assort independently of other pairs of alleles during formation

[✓ B. That alleles of each pair of contrasting trade have an equal probability to associate with the alleles of other pair]

C. That the two coexisting alleles for each trait segregate from each other at meiosis so that each gamete receives only one of the two alleles.

D. That pertains to inheritance of single trait monohybrid cross

Q.73 **Phenotype is:** **(PMC 2020)**

A. The genetic complement i.e. the genes in an individual for a particular trait

B. Partner of gene pair

C. The form of appearance of a trait

D. The position of a gene on the chromosome

Q.74 **Incomplete dominance:** **(PMC 2020)**

A. Different alleles of a gene are both expressed in heterozygous condition

B. One allele is completely dominant over the other and the presence of the recessive allele is functionally hidden so the heterozygote has the same round phenotype as homozygote.

C. The phenotype of the heterozygote is intermediate between phenotypes of the two homozygotes.

D. Gene mutations may produce many different alleles of a gene.

ANSWER KEY

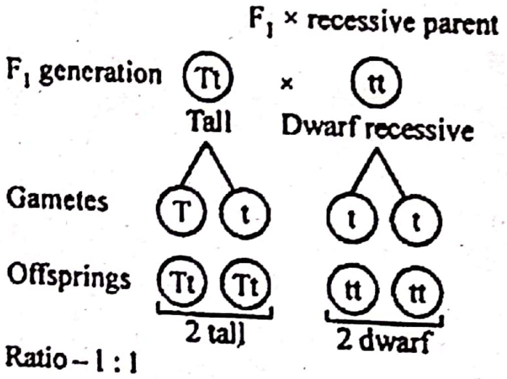
TOPIC-WISE MCQs & PAST PAPER

1	C	11	B	21	B	31	A	41	A	51	D	61	D	71	B
2	A	12	C	22	B	32	A	42	B	52	C	62	B	72	B
3	B	13	A	23	A	33	D	43	D	53	C	63	C	73	C
4	C	14	A	24	A	34	C	44	B	54	C	64	C	74	C
5	A	15	B	25	B	35	D	45	B	55	B	65	B		
6	B	16	A	26	D	36	D	46	A	56	C	66	D		
7	A	17	C	27	B	37	B	47	C	57	C	67	A		
8	A	18	B	28	C	38	B	48	B	58	A	68	D		
9	C	19	B	29	D	39	D	49	A	59	B	69	C		
10	A	20	C	30	B	40	A	50	D	60	C	70	A		

EXPLANATORY NOTES

TOPIC-WISE MCQs & PAST PAPER MCQs

1. Partner of a gene pair is known as allele.
2. Genotype is a genetic makeup of organism that control the expression of a certain trait.
3. The total aggregate of genes in a population at any given time is called the population's gene pool. It consists of all the alleles at all genes loci in all individuals of the population.
4. Such an allele that masks the effect of other allele in a pair is called dominant allele and such trait is dominant.
5. When both alleles of a gene pair in an organism are same, the organism is homozygous for that gene pair. If both alleles of a gene pair are different is called heterozygous. If both male and female sex organs are present in body of same organism is called as hermaphrodite.
6. Physical appearance of a trait is called phenotype. For example, round and wrinkled are phenotypes of seed shape as the shape is a trait.
7. The trait whose effect has been masked in F_1 generation but it reappears in F_2 generation is recessive.
8. In monohybrid cross the phenotypic ratio of dominant and recessive plants during F2 generation would is 3:1.
9. Gene linkage not obey Mendel law of independent assortment.
10. (RR) phenotype is dominant over wrinkle (rr) and yellow (YY) is dominant over green (yy). In F1 generation all plants will be round and yellow seeded.
11.



12.

Tt × Tt
(tall) (tall)

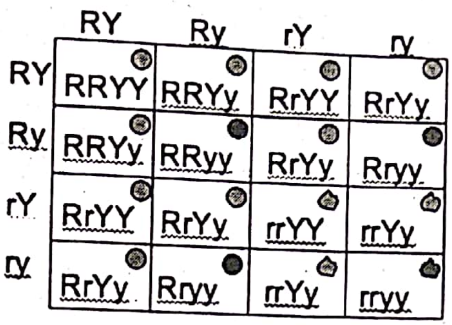
	T	t
T	TT	Tt
t	Tt	tt

Genotypes:
1 TT= Tall
2 Tt = Tall
1 tt = dwarf
Genotypic ratio= 1:2:1

Phenotype:
3 Tall
1 dwarf
Phenotypic ratio= 3:1

13. When a tall plant with rounded seeds (TTRR) is crossed with a dwarf plant with wrinkled seeds (ttrr), then the generation consists of tall plants with rounded seeds, all plants will have TtRr genotype.

14.



	RY	Ry	rY	ry
RY	RRYY	RRYy	RrYY	RrYy
Ry	RRYy	RRyy	RrYy	Rryy
rY	RrYY	RrYy	rrYY	rrYy
ry	RrYy	Rryy	rrYy	rryy

15. There is only single plant showing RRyy genotype in F2 generation of dihybrid cross.
16. All such altered alternative forms of a gene, whose number is more than two are called multiple alleles.
17. Any two of these multiple alleles can be present in the genome of a diploid organism, but a haploid organism or a gamete has just one of them in its genome.
18. Gene mutations may produce many different alleles of a gene.
19.

Phenotype	Genotype	Antigen	Antibody
A	I^AI^A, I^Ai	A	Anti-B antibody
B	I^BI^B, I^Bi	B	Anti-A antibody
AB	I^AI^B	A & B	No Antibody
O	ii	No	Anti-A antibody Anti-B antibody

20.

Phenotype	Genotype	Antigen	Antibody
A	I^AI^A, I^Ai	A	Anti-B antibody
B	I^BI^B, I^Bi	B	Anti-A antibody
AB	I^AI^B	A & B	No Antibody
O	ii	No	Anti-A antibody Anti-B antibody

21. Female has I^AI^A or I^Ai and male is ii, same conditions will be in offsprings.
22. ABO blood group shows four different phenotypes, A, B, AB, and O.
23. Father's genotype is ii so the blood group of offspring can't be AB.
24. Male has "ii" genotype and female is "I^Ai", there are 50% chances for the child with O blood group.
25. Blood group without any antigen can be donated to any other blood.
26. Blood group antigens can be found in RBCs, body fluids and saliva.
27. The Rh blood group is one of the most complex blood groups known in humans. From its discovery 60 years ago where it was named after the Rhesus monkey, it has become second in importance only to the ABO blood group in the field of transfusion medicine.
28. Colour Blindness and Haemophilia are X linked recessive traits while Albinism is autosomal recessive; lastly Rh factor is autosomal dominant trait.
29. Erythroblastosis fetalis is hemolytic anemia in the fetus (or neonate, as erythroblastosis neonatorum) caused by transplacental transmission of maternal antibodies to fetal red blood cells. The disorder usually results from incompatibility between maternal and fetal blood groups, often Rho (D. antigens.

30. Gene linkage minimizes the chances of genetic recombination and variation among offspring.
31. Genes for colour blindness, haemophilia, gout etc. form one linkage group on human X chromosome.
32. The recombination frequency is 20% between the two genes. The distance between them in unit map is 20.
33. A pair of genes with a larger recombination frequency are likely farther apart, while a pair with a smaller recombination frequency are likely closer together. Therefore, we should start with the largest recombination frequency (RF) of two genes. In this case, C and D are the farthest apart, so A and B must be between them.
34. Number of linkage groups in an organism is equal to number of chromosomal pairs.
35. Hemophilia, colorblindness and Parkinson's disease are due to genetic disorders.
36. Testicular feminization syndrome is a rare X-linked recessive trait. Similarly, Haemophilia is also X-linked recessive.
37. Haemophilia A and B are non-allelic recessive sex-linked but hemophilia C is an autosomal recessive trait (Autosome 4).
38. Like any sex-linked recessive traits, colorblindness is also moves zigzags from maternal grandfather through a carrier daughter to a grandson.
39.

Parental

Phenotypes Carrier Female x Normal Male

Genotypes X^NX^n X^NY

Gametes X^N X^n X^N Y

Offspring 1

Genotypes

		Female Gametes	
		X^N	X^n
Male Gametes	X^N	X^NX^N	X^NX^n
	Y	X^NY	X^nY

Phenotypes

Normal Female : Carrier Female : Normal Male : Colour blind Male
1 : 1 : 1 : 1

40. Female can be carrier but phenotypically will be normal.
41. The position of a gene on the chromosome is called its locus.
42. ABO blood group is first discovered multiple allelic blood group system in man.
43. 22 pairs of chromosomes are autosomes in human. One pair is of sex chromosomes.
44. Haemophilia and colour blindness are X-linked recessive traits.
45. According to Mendel particular hereditary factors that carry specific character from parents to offsprings is called as Elementon.
46. The total aggregate of genes in a population at any given time is called the population's gene pool. It consists of all the alleles at all genes loci in all individuals of the population. Genome is the collection of all the genes present in an individual.
47. ABO blood group is first discovered multiple allelic blood group system in man. This blood group system is encoded by a single polymorphic gene I on chromosome 9. It has three multiple alleles I^A, I^B and i.
48. Haemophilia and colour blindness are X-linked recessive traits.
49. The position of a gene on the chromosome is called its locus.

50.

Event No.1	Event No.2	Both Events at a Time
Seed Shape	**Seed Colour**	**Seed Shape & Colour**
Independent Probability	**Independent Probability**	**Joint Probability**
Round = 3/4	Tall = 3/4	Round tall = 3/4 x 3/4 = 9/16
Round = 3/4	dwarf = 1/4	Round dwarf= 3/4 x 1/4 = 3/16
Wrinkled = 1/4	Tall = 3/4	Wrinkled Tall = 1/4 x 3/4 = 3/16
Wrinkled = 1/4	dwarf = 1/4	Wrinkled dwarf = 1/4 x 1/4 = 1/16

51. Purple colour flowers are dominant over white colour plants.
52. The genes for red and green opsins are on X chromosome while the gene for blue opsin is present on autosome 7.
53. Genes are actually parts of DNA comprising its basic sequence.
54. The position of a gene on the chromosome is called its locus.
55. ABO blood group is first discovered multiple allelic blood group system in man.
56. Number of linkage group is equal to number of homologous chromosomes in a cell. There are 23 linkage groups in human cell.
57. The value of Cross over or recombination frequency is directly proportional to distance between the genes on gene map.
58. When both alleles of a gene pair in an organism are same, the organism is homozygous for that gene pair.
59. The position of a gene on the chromosome is called its locus.
60.

Paternal

Maternal	S	s
S	SS	Ss
s	Ss	ss

SICKLE CELL DISEASE
Recessive

Each child's chances are:

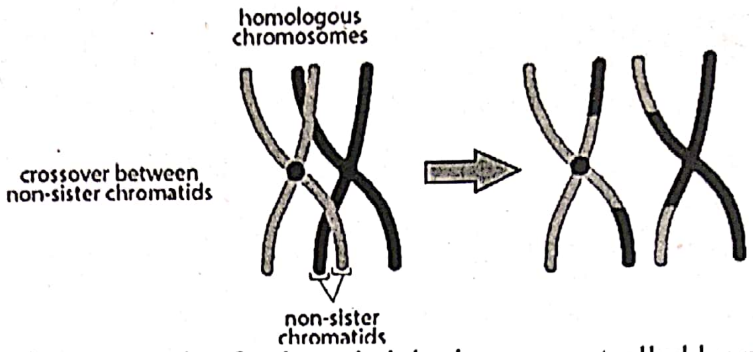
25% of not having the disease (SS)
25% of having the disease (ss)
50% of carrying the disease.

61. Linked genes do not obey law of independent assortment.
62.

Gender	Genotype	Phenotype
Female	X^HX^H	Normal
	X^HX^h	Normal but Carrier
	X^hX^h	Haemophilic
Male	X^HY	Normal
	X^hY	Haemophilic

63. To give birth an O blood group type child, parents should have A or B blood group in heterozygous form.
64. Gene linkage not obey Mendel law of independent assortment.

65.



66. Human height is an example of polygenic inheritance, controlled by multiple gene pairs.

67. Total number of chromosomes in *Pisum sativum* (pea plant) are 14.

68. Gene for hemophilia is linked with X-chromosome in recessive form.

69. Haemophilia A and B, color blindness are the example of X-Linked Recessive Traits.

70. X-Linked recessive traits affect male more ass compare to female and vice versa for X-linked dominant traits.

71. **Heterozygous:** Heterozygous is a state of having inherited different forms of a particular gene from each one of your biological parents

Homozygous: Homozygous describes the genetic condition or the genetic state where an individual has inherited the same DNA sequence for a particular gene from both their biological mother and their biological father

Genotype: In a broad sense, the term "genotype" refers to the genetic makeup of an organism

Phenotype: The term "phenotype" refers to the observable physical properties of an organism.

72. Mendel's law of independent assortment states that the alleles of two (or more) different genes get sorted into gametes independently of one another. In other words, the allele a gamete receives for one gene does not influence the allele received for another gene.

73. **Phenotype:** The term "phenotype" refers to the observable physical properties of an organism.

74. Incomplete dominance is when a dominant allele, or form of a gene, does not completely mask the effects of a recessive allele, and the organism's resulting physical appearance shows a blending of both alleles.

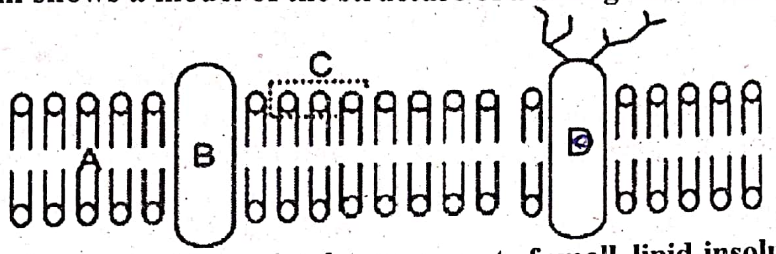
1 UNIT CELL STRUCTURE AND FUNCTION

SELF ASSESSMENT TEST

Q.1 **Some cellular organelles are bounded by a single membrane, while others have two membranes around them. Which one of the following is correct?**

	Single membrane		Two membranes	
[✓ A.]	Vacuole	Lysosome	Nucleus	Chloroplast
B.	Chloroplast	Lysosome	Nucleus	Vacuole
C.	Nucleus	Chloroplast	Lysosome	Vacuole
D.	Nucleus	Lysosome	Chloroplast	Vacuole

Q.2 **The diagram shows a model of the structure of a biological membrane:**



Which labeled part would restrict the movement of small, lipid-insoluble molecules?

Q.3 **Cells without nucleoli die because they do not possess:**
A. Centrioles, and are unable to undergo cell division
B. Lysosomes, and are unable to destroy worn out organelles
C. Mitochondria, and are unable to obtain energy
[✓ D.] Ribosomes, and are unable to manufacture proteins

Q.4 **It is synthesized by free floating ribosomes of cytoplasm in humans:**
A. Pancreatic lipase
✗ B. Salivary amylase
C. Insulin
✓ [✓ D.] DNA helicase

Q.5 **These play vital role in defense activity of macrophages:**
A. Mitochondria
[✓ B.] Lysosomes
C. Lysozymes
D. Ribosomes

Q.6 **Damage to one of the following immediately kills the cell whether its prokaryotic or eukaryotic:**
A. Mitochondria
[✓ B.] Cell membrane
C. Cell wall
D. Golgi apparatus

Q.7 **Which of these is not a part of murein?**
A. Polysaccharides
B. Glycans
C. Amino acid chains
[✓ D.] Proteins

Q.8 **Movement of Na$^+$ across axon membrane via Na$^+$-K$^+$ pump is an example of:**
[✓ A.] Active transport
B. Diffusion
C. Passive transport
D. Osmosis

Q.9 **Which one always passes through nuclear membrane from nucleoplasm to cytoplasm?**
A. Proteins
B. DNA nucleotides
C. Enzymes
[✓ D.] RNA

Q.10 **Cytoplasmic streaming movement causes flow of all except:**
[✓ A.] Endoplasmic reticulum
B. Lysosomes
C. Mitochondria
D. Glucose and salts

Q.11 **They help to detoxify the harmful drugs:**
A. Ribosomes
[✓ B. SER]
C. RER
D. Golgi bodies

Q.12 **In Golgi apparatus, cisternae are thought to be moving from ____ to _______ face.**
A. Inner, outer
B. Medial, lateral
C. Concave, convex
[✓ D. Convex, concave]

Q.13 **It is mismatched with reference to mitochondrial membrane:**
A. Outer membrane- Smooth
B. Inner membrane - F_1 particles
[✓ C. Outer membrane – Chemiosmosis]
D. Inner membrane - Increases surface area

Q.14 **In prokaryotic cell, wall strengthening material is:**
A. Cellulose
B. Chitin
C. Silica
[✓ D. Peptidoglycan]

Q.15 **Cell secretions are actually produced at ________, then transported to outside through _______ and _________.**
A. Ribosomes, RER, SER
B. RER, Golgi apparatus, Lysosomes
C. Ribosomes, Golgi apparatus, SER
[✓ D. Ribosomes, ER, Golgi apparatus]

Q.16 **Types of ribosome present in the cytosol and organelles of the eukaryotic cell are respectively:**
A. 60S and 40S
[✓ B. 80S and 70S]
C. 70S and 80S
D. 80S and 80S

Q.17 **Which of the following cell types would you expect to be abundant with endoplasmic reticulum and Golgi bodies?**
I. Plasma B cells (produce antibodies)
II. Adipose cells (store fats)
III. Islet of Langerhans cells (secrete insulin)
IV. Red blood cells (transport oxygen)
A. I and II only
[✓ B. I and III only]
C. III and IV only
D. II and III only

Q.18 **Which of the following is a protective structure in bacterial cells?**
[✓ A. Cell wall]
B. Protoplasm
C. Cellulose
D. Nuclei

Q.19 **Plant cells are distinguishable from animal cells in containing:**
A. Mitochondria
B. Endoplasmic reticulum
C. Ribosomes
[✓ D. Cell wall]

Q.20 **Endoplasmic reticulum is absent in:**
A. Animal cells
B. Plant cells
[✓ C. Prokaryotic cells]
D. Protists and Fungal cells

Q.21 **Which one is always unicellular?**
[✓ A. Mycoplasma]
B. Protists
C. Virus
D. Algae

Q.22 **If size of a particle is large or it has polarity, the suitable method of transportation will be:**
A. Osmosis
[✓ B. Facilitated diffusion]
C. Diffusion
D. Passive transport

Q.23 **Nucleolus contains:**
[✓ A. Ribosomal precursor]
B. Polysome
C. Protein precursor
D. Lipid precursor

Q.24 Transport of glucose into the cell with the help of insulin is an example of:
A. Osmosis
[✓ B. Facilitated diffusion]
C. Active transport
D. Endocytosis

Q.25 The functional units of Golgi apparatus are:
A. Thylakoids
B. Cristae
C. Oxysomes
[✓ D. Cisternae]

Q.26 The entire cell wall of bacteria is often regarded as a single huge molecule or molecular complex called:
A. Capsule
B. Slime capsule
C. Secondary wall
[✓ D. Sacculus]

Q.27 Outer and inner membranes of mitochondria are:
A. Structurally and functionally similar
B. Structurally similar but functionally different
[✓ C. Structurally and functionally different]
D. Structurally different but functionally similar

Q.28 Which substances can cross plasma membrane more easily?
A. Ions
[✓ B. Lipid soluble]
C. Proteins
D. Starch

Q.29 Part of cell membrane which is in contact with external and internal environment is:
A. Hydrophobic
B. Hydrophilic and hydrophobic
[✓ C. Hydrophilic]
D. Neutral

Q.30 The ratio of RNA and protein in a ribosome is:
[✓ A. 1: 1]
B. 4: 7
C. 2: 3
D. 3: 1

Q.31 Secretory granules bud off from:
[✓ A. Golgi bodies]
B. Vacuoles
C. SER
D. Nucleus

Q.32 What is a polysome?
A. Group of mRNAs and one ribosome
B. Many ribosomes and many mRNAs
C. mRNA + rRNA + tRNA + ribosome
[✓ D. One mRNA and many ribosomes]

Q.33 The vesicles which diffuse to form stack of cisternae sacs are derived from:
[✓ A. Golgi Apparatus]
B. SER
C. RER
D. Lysosomes

Q.34 Which one is a self-replicating organelle?
A. Ribosome
B. Centriole
C. Lysosome
[✓ D. Mitochondrion]

Q.35 The exact replica of the chromosome is:
A. Centromere
[✓ B. Chromatid]
C. Kinetochore
D. Nucleosomes

Q.36 Which of the following organelle is involved in autophagy?
[✓ A. Lysosomes]
B. Glyoxysomes
C. Peroxisomes
D. Microsomes

Q.37 All of the following are single membranous organelles except:
[✓ A. Mitochondria]
B. Glyoxysomes
C. Lysosomes
D. Peroxisomes

Q.38 Lysosomes are most abundant in:
A. Plant cells having phagocytic activity
B. Protozoa
C. Bacteria with additional DNA plasmids
[✓ D. Animal cells having phagocytic activity]

Q.39 The absence of an enzyme that is involved in the catabolism of lipids results in:

[✓ A. Tay-Sach's disease]
B. Glycogenosis type II
C. Glycogenosis type I
D. Phenylketonuria

Q.40 Tay-Sach's disease mostly affects which of the followings organ in human body:

A. Liver
B. Kidneys
[✓ C. Brain]
D. Muscles

Q.41 The lysosomes which eat parts of their own cells or cellular components during cellular starvation are called:

A. Primary lysosomes
B. Secondary lysosomes
C. Tertiary lysosomes
[✓ D. Autophagosome]

Q.42 Interior of chloroplast is divided into heterogeneous structure, embedded in the matrix known as:

[✓ A. Grana]
B. Thylakoids
C. Stroma
D. Cisternae

Q.43 Plastids are only found in the:

A. Animals and Plants
[✓ B. Plants]
C. Animals
D. Viruses

Q.44 Plasma membrane is chemically composed of:

A. Phospholipids only
B. Lipids and carbohydrates
[✓ C. Lipids and proteins]
D. Glycoproteins

Q.45 The ribosomal RNA is synthesized and stored in:

A. Endoplasmic reticulum
B. Golgi complex
[✓ C. Nucleolus]
D. Chromosomes

Q.46 The enzymes of lysosomes are synthesized on:

[✓ A. RER]
B. Chloroplast
C. SER
D. Golgi apparatus

Q.47 The size and number of mitochondria in a cell depends upon which factor?

A. Size and shape of the cell
B. Genetic makeup
[✓ C. Physiological activities]
D. Evolutionary history

Q.48 The process by which unwanted substances within the cell are engulfed and digested within the lysosome is known as:

A. Endocytosis
B. Hydrolysis
C. Exocytosis
[✓ D. Autophagy]

Q.49 The function of nucleolus is to make:

A. rDNA
B. RNA
[✓ C. Ribosomes]
D. Chromosomes

Q.50 Peptidoglycan cell wall is present in?

A. *Penicillium*
B. *Adiantum*
[✓ C. Bacterium]
D. *Polytrichum*

Q.51 Which of the following function is not performed by the cell membrane of a plant cell?

A. Regulation of material
B. Active transport
C. Transport of material
[✓ D. Phagocytosis]

Q.52 Organelles involved in organic molecule synthesis and organic molecule breakdown respectively:

A. Mitochondria and ribosomes
[✓ B. Chloroplast and mitochondria]
C. Chloroplast and ribosomes
D. Mitochondria and chloroplast

Q.53 Which organelle in eukaryotic cell functionally resemble with mesosomes of prokaryotic cell?

A. Golgi apparatus
B. Cell membrane
C. Endoplasmic reticulum
[✓ D. Mitochondria]

Q.54 Which type of molecule will make channels for movement of neutral substances down concentration gradient?

A. Phospholipids
B. Nucleic acid
[✓ C. Protein]
D. Carbohydrates

Q.55 Under which of the following conditions, would you expect to find a cell with a predominance of free ribosomes?

A. A cell that is secreting proteins
B. A cell that digesting food particles
[✓ C. A cell producing cytoplasmic enzymes]
D. A cell that enlarging its vacuole

Q.56 Cell secretions are the products of:

[✓ A. Ribosomes]
B. Lysosomes
C. Golgi apparatus
D. Mitochondria

Q.57 Mitochondria have enzyme for all of these process except:

A. Replication of DNA
B. Fatty acid metabolism
C. Krebs cycle
[✓ D. Fermentation]

Q.58 Which of the following feature is common between prokaryotes and eukaryotes?

A. A membrane bounded nucleus
B. A cell wall made up cellulose
[✓ C. Presence of ribosomes]
D. Linear genome

Q.59 Concerning entry of substances through plasma membrane, which statement is correct?

A. Only passive transport needs energy
B. Phagocytosis is passive transport
[✓ C. Only active transport needs energy]
D. Passive and active transport need energy

Q.60 An organelle having its own DNA, ribosomes and protein formation indicate that organelle is:

[✓ A. Self-replicating]
B. Self-twisting
C. Self-indicating
D. Self-reproducing

ANSWER KEY

1	A	11	B	21	A	31	A	41	D	51	D
2	D	12	D	22	B	32	D	42	A	52	B
3	D	13	C	23	A	33	A	43	B	53	D
4	D	14	D	24	B	34	D	44	C	54	C
5	B	15	D	25	D	35	B	45	C	55	C
6	B	16	B	26	D	36	A	46	A	56	A
7	D	17	B	27	C	37	A	47	C	57	D
8	A	18	A	28	B	38	D	48	D	58	C
9	D	19	D	29	C	39	A	49	C	59	C
10	A	20	C	30	A	40	C	50	C	60	A

2 UNIT BIOLOGICAL MOLECULES & ENZYMES

SELF ASSESSMENT TEST

Q.1 These are most abundant organic compounds to be found in cells:

A. Carbohydrates
B. Lipids
[✓ C]. Proteins
D. Water

Q.2 What does a hemoglobin molecule contain?

A. Four Fe^{2+} attached to each haeme group
C. Four oxygen molecules attached to each haeme group
B. Four polypeptide chains each with four attached haeme groups
[✓ D]. Four polypeptide chains each with one attached haeme group

Q.3 All of the following elements are present in all carbohydrates except:

A. Carbon
B. Hydrogen
C. Oxygen
[✓ D]. Nitrogen

Q.4 Which term most appropriately describes catalase, collagen and haemoglobin?

A. Enzymes
B. Globular proteins
C. Fibrous proteins
[✓ D]. Polypeptides

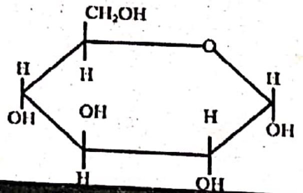
Q.5 Which property of proteins enables them to act as pH buffers?

A. They are soluble
[✓ B]. They contain carboxyl and amino groups
C. They have a high molecular mass
X D. They possess both secondary and tertiary structure

Q.6 ______________ has unbranched chains of glucose and is soluble in hot water.

[✓ A]. Amylose
X B. Glycogen
C. Amylopectin
D. Cellulose

Q.7 The diagram shows a ring structure of glucose. Which form of glucose is shown and in which molecule is it present?



	Form of glucose	Where present
A.	α	Cellulose
[✓ B].	α	Starch
C.	β	Cellulose
D.	β	Starch

Q.8 Silk protein is present in:

A. Nail
B. Hair
C. Plant cell wall
[✓ D]. Spider's web

Q.9 All of the following are true about lipids except:

A. They store high amount of energy
[✓ B]. They are polymers of fatty acids
C. They play important role in insulation
D. They are mostly hydrophobic in nature

Q.10 Cuticle is an example of:

A. Acylglycerols
[✓ B]. Waxes
C. Phospholipids
D. Terpenoids

Q.11 Which of these is not constituent of waxes?
A. Long chain alkanes
B. Alcohols
[✓ C. Aldehydes]
D. Ketones

Q.12 A group of lipids that does not contain fatty acids:
A. Acylglycerols
B. Waxes
C. Phospholipids
[✓ D. Terpenoids]

Q.13 All are true about ATP except:
A. Energy currency of cell
B. Contains ribose sugar
[✓ C. Contains three high energy bonds]
D. Contains three phosphate groups

Q.14 Which one of the following is an example of reducing sugar?
A. Sucrose
B. Starch
[✓ C. Maltose]
D. Cellulose

Q.15 Adenine and guanine are:
[✓ A. Main nitrogenous bases of nucleic acids]
B. Main nitrogenous wastes of humans
C. Main nitrogenous bases of phospholipids
D. Main types of amino acids in proteins

Q.16 Formation of RNA from DNA is known as:
A. Translation
[✓ B. Transcription]
C. Replication
D. Hydrolysis

Q.17 3′ end of nucleic acids have always a free _______group.
A. Phosphate
B. Carboxylic
[✓ C. Hydroxyl]
D. Amino

Q.18 Which one of the following is not an example of polymeric compound?
[✓ A. Lipids]
B. RNA
C. Proteins
D. Starch

Q.19 Form of polysaccharide stored in bacteria and animals:
A. Starch
B. Cellulose
[✓ C. Glycogen]
D. Chitin

Q.20 A structural protein is:
A. Pepsin
[✓ B. Collagen]
C. Haemoglobin
D. Immunoglobulin

Q.21 Sugar found in genetic material is:
A. Hexose sugar
B. Tetrose sugar
[✓ C. Pentose sugar]
D. Triose sugar

Q.22 Nitrogen bases of nucleotides in RNA are attached to:
[✓ A. Sugar molecules]
B. Nucleoside
C. Phosphate radicals
D. Deoxyribose

Q.23 Total number of amino acids in alpha chain of insulin are:
A. 20
[✓ B. 21]
C. 30
D. 51

Q.24 Which one is found only in RNA?
A. Cytosine
[✓ B. Uracil]
C. Adenine
D. Guanine

Q.25 A monosaccharide is:
A. Lactose
[✓ B. Ribose]
C. Sucrose
D. Maltose

Q.26 The most common carbohydrate monomer is:
A. Maltose
[✓ B. Glucose]
C. Lactose
D. Galactose

Q.27 Which forms nails, hair and feathers?
A. Fibrin
B. Collagen
[✓ C. Keratin]
D. Elastin

Q.28 Most important type of RNA in cell is:
A. rRNA
B. tRNA
[✓ C. mRNA]
D. cRNA

Q.29 Immediate source of energy is:
A. Sucrose
B. Fat
[✓ C. Glucose]
D. Starch

Q.30 Most of cellular secretions are:
A. Phospholipids
[✓ B. Glycoproteins]
C. Nucleoproteins
D. Glycolipids

Q.31 Which of the following statement is not true for compounds like glycoproteins and glycolipids?
A. Both are conjugated molecules
[✓ B. Both synthesized in endoplasmic reticulum]
C. Component of biological membrane
D. Both are components of extracellular matrix of animal cell membrane

Q.32 Number of oxygen atoms in lipid molecules is always _____ as compared to number of carbon atoms.
[✓ A. Less]
B. Equal
C. More
D. Double

Q.33 Two amino acid monomers are joined by:
A. Hydrogen bond
B. Phosphodiester bond
[✓ C. Peptide bond]
D. Ester bond

Q.34 Unsaturated fats are made saturated by:
A. Polymerization
B. Dehydrogenation
[✓ C. Hydrogenation]
D. Hybridization

Q.35 A peptide chain attains secondary structure through the formation of:
A. Peptide bond
[✓ B. Hydrogen bond]
C. Ionic bond
D. Disulphide bond

Q.36 All of the following pairs contain keratin except:
A. Hooves & Horns
B. Skin & Feathers
C. Hair & Nails
[✓ D. Muscles & Bones]

Q.37 Which one of the followings is the optimum pH of pancreatic lipase enzyme?
A. 7.60
B. 9.70
C. 8.00
[✓ D. 9.00]

Q.38 Which one of the following is organic in nature?
A. Activator
B. Cofactor
[✓ C. Co-enzyme]
D. Malonate ions

Q.39 Optimum pH of salivary amylase is:
[✓ A. Slightly acidic]
B. Highly acidic
C. Slightly basic
D. highly basic

Q.40 Enzyme after catalysis detaches itself from the product:
A. Completely
B. Changed
C. Incompletely
[✓ D. Unchanged]

Q.41 ________ forms weak linkages with enzymes and their effect can be neutralized completely or partly by an increase in the concentration of the substrate.
A. Only competitive Inhibitors
B. Irreversible inhibitors
[✓ C. Reversible inhibitors]
D. Both reversible and irreversible inhibitors

Q.42 The non-protein part of enzyme which is covalently and permanently bonded is called:
[✓ A. Prosthetic Group]
B. Co-Enzyme
C. Co-Factor
D. Activator

Q.43 Enzymes increase the rate of reaction by:
A. Increasing Temperature
[✓ B. Decreasing Activation Energy]
C. Decreasing pH
D. Increasing Activation Energy

Q.44 Enzyme succinate dehydrogenase converts succinate into:
A. Malate
B. Citrate
C. Malonic acid
[✓ D. Fumarate]

Q.45 The view that active site of an enzyme is flexible and when a substrate combines with it, cause changes in enzyme structure is known as:
A. Lock & key model
B. Sliding filament model
[✓ C. Induce fit model]
D. Specificity model

Q.46 Regulatory sites other than active site, present over the enzymes are called:
A. Active sites
B. Binding site
C. Catalytic groups
[✓ D. Allosteric sites]

Q.47 An activated enzyme consisting of polypeptide chain and a cofactor is called:
A. Apoenzyme
[✓ B. Holoenzyme]
C. Coenzyme
D. Proenzyme

Q.48 Activators are usually derived from:
A. Vitamins
B. Carbohydrates
C. Proteins
[✓ D. Metal ions]

Q.49 At a certain point where conversion of substrate/s into product/s is maximum, the enzyme/s would be:
A. Free
B. Denatured
C. Activated
[✓ D. Saturated]

Q.50 A three-dimensional cavity bearing a specific charge by which the enzyme reacts with its substrate is called:
[✓ A. Active site]
B. Binding site
C. Catalytic site
D. Allosteric site

Q.51 Which step causes activation of catalytic site of an enzyme?
A. Change in pH of enzyme
[✓ B. Formation of ES complex]
C. Change in the shape of substrate
D. Change in temperature

Q.52 In a naturally occurring chemical reaction, all active sites are occupied, the rate of reaction would be:
A. Minimum and constant
B. Zero and constant
C. Maximum and accelerating
[✓ D. Constant and maximum]

Q.53 Excessive increase in temperature of medium causes the enzyme molecule to be:
A. Activated
B. Unaffected
[✓ C. Denatured]
D. Inactivated

Q.54 Inhibitors are chemically:
A. Metals B. Organic
C. Inorganic [✓ D. All A, B, C]

Q.55 Optimum temperature of enzymes present in human body is:
A. 27°C [✓ B. 37°C]
C. 47°C D. 30°C

Q.56 Inhibitors which block the enzyme by forming weak bond are called:
A. Competitive inhibitors. B. Non- competitive inhibitors.
C. Irreversible inhibitors. [✓ D. Reversible inhibitors]

Q.57 Malonic acid is an example of:
A. Irreversible inhibitor B. Reversible inhibitor
[✓ C. Competitive inhibitor] D. Non-competitive inhibitor

Q.58 Enzymes belong to which class of proteins?
A. Fibrous B. Glycoprotein
[✓ C. Globular] D. Lipoprotein

Q.59 Apoenzyme is:
[✓ A. Protein part of enzyme] B. Activated enzyme
C. Non protein part of enzyme D. Co-enzyme

Q.60 Specificity of an enzyme is determined by:
A. Globular shape B. pH of environment
C. Charge on substrate [✓ D. Charge and shape of active site]

ANSWER KEY

1	C	11	C	21	C	31	B	41	C	51	B
2	D	12	D	22	A	32	A	42	A	52	D
3	D	13	C	23	B	33	C	43	B	53	C
4	D	14	C	24	B	34	C	44	D	54	D
5	B	15	A	25	B	35	B	45	C	55	B
6	A	16	B	26	B	36	D	46	D	56	D
7	B	17	C	27	C	37	D	47	B	57	C
8	D	18	A	28	C	38	C	48	D	58	C
9	B	19	C	29	C	39	A	49	D	59	A
10	B	20	B	30	B	40	D	50	A	60	D

3 UNIT

BIOENERGETICS

SELF ASSESSMENT TEST

Q.1 Which of the following describes condition in a photosynthesizing cell, exposed to high light intensity and low carbon dioxide concentration?

	Concentration of CO_2 acceptor	Concentration of ATP	Concentration of GP (PGA.
[✓ A.]	High	High	Low
B.	Low	High	High
C.	High	Low	Low
D.	Low	Low	High

Q.2 Z-scheme is another name used for:

A. Cyclic photophosphorylation
B. Calvin cycle
[✓ C. Non-cyclic photophosphorylation]
D. Oxidative phosphorylation

Q.3 Photosystem II has reaction center of:

[✓ A. P_{680}]
B. P_{700}
C. P_{730}
D. P_{660}

Q.4 Which of the following is a molecule formed in metabolic pathway by the equal splitting of a phosphorylated hexose into two halves?

A. Acetyl coenzyme A
B. Ribulosebisphosphate
C. Fructose 1, 6-bisphosphate
[✓ D. Triose phosphate]

Q.5 What is the function of molecular oxygen in cellular respiration?

A. To cause the breakdown of citric acid
C. To combine with glucose to produce carbon dioxide
B. To combine with carbon from organic molecules to produce carbon dioxide
[✓ D. To combine with hydrogen from organic molecules to produce water]

Q.6 How many moles of carbon dioxide are produced by the complete oxidation of 1 mole of pyruvate?

A. 1
B. 4
[✓ C. 3]
D. 6

Q.7 The reaction which occurs in thylakoid interior space:

[✓ A. Photolysis]
B. ATP synthesis
C. Transport of electrons
D. Dark reaction

Q.8 In photosynthetic prokaryotes, which of the following might be absent?

[✓ A. Grana]
B. Thylakoid like membranes
C. Chlorophyll
D. ATP synthase

Q.9 The wavelengths of light least absorbed by carotenes are:

[✓ A. Blue to green]
B. Red to orange
C. Yellow to orange
D. Yellow to red

Q.10 What will be the number of carbon and hydrogen atoms respectively in the tail of chlorophyll b molecule?

[✓ A. 20, 39]
B. 20, 40
C. 55, 72
D. 55, 70

Q.11 A plant shifts from cyclic to non-cyclic flow of electron when:

A. It has low reducing power
[✓ B. Assimilating power is restored]
C. It runs low on assimilating power
D. It has sufficient reducing power

Q.12 Photosystem I and II are differentiated on the basis of their:

[✓ A. Chlorophyll a]
B. Chlorophyll b
C. Primary electron acceptor
D. Carotenoids

Q.13 In which of the following steps, NADH is formed without decarboxylation?

A. Isocitrate → α-ketoglutarate
B. Pyruvate → Acetyl CoA
C. α-ketoglutarate → succinate
[✓ D. Malate → oxaloacetate]

Q.14 The oxidation of which of the following will produce $FADH_2$?

A. Malate
B. Fumarate
C. FAD
[✓ D. Succinate]

Q.15 Light energy is converted into chemical energy through the formation of:

A. NADH
[✓ B. ATP and $NADPH_2$]
C. ADP
D. RuBP

Q.16 Photophosphorylation during photosynthesis consists of:

[✓ A. Cyclic and non-cyclic phosphorylation]
B. Substrate level phosphorylation
C. Oxidative phosphorylation
D. Respiratory chain

Q.17 The by-product of photosynthesis is:

A. Organic compound
B. $NADPH_2$
[✓ C. Oxygen]
D. Energy

Q.18 Stroma is the ground matrix of:

A. Lysosomes
B. Ribosomes
C. Oxysomes
[✓ D. Chloroplast]

Q.19 In which wavelength of light, photosynthesis is maximum?

[✓ A. Red light]
B. Blue light
C. Green light
D. Ultra-violet light

Q.20 Source of protons within the chloroplasts is:

[✓ A. Water]
B. Carbon dioxide
C. Excited chlorophyll molecules
D. Rubisco

Q.21 Dark reactions of carbon assimilation occur in:

A. Cytoplasmic matrix
B. Leucoplasts
C. Mitochondria
[✓ D. Chloroplasts]

Q.22 The number of carbon atoms present in ribulose:

A. 6
B. 4
[✓ C. 5]
D. 3

Q.23 ATP molecules required for synthesis of a glucose molecule in Benson-Calvin cycle are:

A. 36
B. 12
C. 38
[✓ D. 18]

Q.24 Photophosphorylation is synthesis of:

A. ADP from ATP
[✓ B. ATP from ADP]
C. Glucose 6-phosphate from glucose
D. $NADP^+$ from NAD^+

Q.25 When a molecule of pyruvic acid is subjected to anaerobic respiration and forms lactic acid, then:

A. 2 ATP are formed
[✓ B. No ATP is formed]
C. 4 ATP are formed
D. 6 ATP are formed

Q.26 Incomplete breakdown of sugars in anaerobic respiration forms:

A. Fructose and water
[✓ B. Alcohol and CO_2]
C. Glucose and CO_2
D. Water and CO_2

Q.27 Following is/are obtained during cyclic photophosphorylation:

[✓ A. ATP]
B. $NADPH_2$
C. O_2
D. All A,B,C

Q.28 Before entering Krebs cycle, the pyruvate is first decarboxylated and oxidized into:
A. Alpha ketoglutaric acid
B. Glyceric acid
C. Citric acid
[✓ D. Acetic acid]

Q.29 Which one are intermediates in respiration and photosynthesis both?
A. Ribose and heptulose
B. Glucose and galactose
[✓ C. Glyceraldehydes& dihydroxyacetone]
D. Fructose and ribulose

Q.30 ATP formation occurs during all of the following steps of aerobic respiration except:
A. Glycolysis
B. Krebs cycle
[✓ C. Pyruvic acid oxidation]
D. Electron transport chain

Q.31 Action spectrum of photosynthesis was described in 1883 by:
A. Robert Hill
B. C. Calvin
[✓ C. T.W. Engelmann]
D. Hatch and Slack

Q.32 Conversion of NAD^+ into NADH requires:
[✓ A. 2 Electrons 1 proton]
B. 2 Electrons 2 protons
C. 1 Electron 2 protons
D. 1 Electrons 1 proton

Q.33 Which of the following molecules is reduced by accepting hydrogen in Calvin cycle?
A. Glyceraldehyde-3-phosphate
B. 3-Phosphoglycerate
C. Ribulose bisphosphate
[✓ D. 1,3-Bisphosphoglycerate]

Q.34 Immediate source of energy for cellular metabolism is:
A. Lipids
B. Carbohydrates
[✓ C. ATP]
D. Proteins

Q.35 Krebs cycle in mitochondria takes place in:
A. Cytosol
B. Outer Membrane
[✓ C. Matrix]
D. Inner Membrane

Q.36 Chlorophyll a is present in all except:
A. Kelps
B. *Spirogyra*
C. Wheat
[✓ D. Purple sulphur bacteria]

Q.37 Energy transformation in biological systems is called:
A. Metabolism
B. Photosynthesis
C. Photorespiration
[✓ D. Bioenergetics]

Q.38 The difference between non-cyclic and cyclic phosphorylation:
A. Types of photosystems involved
B. Product form
C. Time duration
[✓ D. All A, B and C]

Q.39 Organisms using hydrogen sulphide as source of protons during photosynthesis:
A. Algae
B. Fungi
C. Trees
[✓ D. Bacteria]

Q.40 The one which is not correct about chlorophyll 'b'?
A. Used in photosynthesis
B. Soluble in organic solvents
C. Present in plants
[✓ D. Have different forms]

Q.41 Ribulose bisphosphate is a:
A. Protein
B. Nucleic acid
C. Lipid
[✓ D. Carbohydrates]

Q.42 Pick one statement that truly represents the net gain of glycolysis:
A. $2H_2O$, 2NADH, 4ATP, 2Pyruvates
B. $2H_2O$, 1NADH, 4ATP, 2Pyruvates
[✓ C. $2H_2O$, 2NADH, 2ATP, 2Pyruvates]
D. $2H_2O$, 4ATP, 2Pyruvate

Q.43 All of the following takes place during glycolysis except:
A. Oxidation
[✓ B. Decarboxylation]
C. Reduction
D. Phosphorylation

Q.44 It is a five carbon compound of Krebs cycle:
A. Oxaloacetate
B. Succinate
[✓ C. Alpha–ketoglutarate]
D. Isocitrate

Q.45 The first stable compound formed during light independent reactions contains:
A. 6 carbon atoms
[✓ B. 3 carbon atoms]
C. 5 carbon atoms
D. 4 carbon atoms

Q.46 Enzymes required for respiratory chain are present on/in:
[✓ A. Cristae]
B. Mitochondrial matrix
C. Inter-membrane space
D. Cytoplasm

Q.47 Net gain of ATP molecules produced in algae after complete breakdown of one glucose molecule during aerobic respiration:
A. 28
B. 38
[✓ C. 36]
D. 40

Q.48 During Krebs cycle carbon number is reduced by decarboxylation. It is repeated __________ time/s during one cycle.
A. One
[✓ B. Two]
C. Four
D. Three

Q.49 Calvin cycle is also named as:
[✓ A. C_3 pathway]
B. Sugar synthesis phase
C. Dark reactions
D. All of these

Q.50 The end product of anaerobic respiration in humans and other animals is:
A. Pyruvic acid
B. Ethanol
[✓ C. Lactic acid]
D. Glucose

Q.51 The products of light reaction move form _____ to _____.
A. Stroma, Grana
[✓ B. Grana, Stroma]
C. Matrix, Cristae
D. Cristae, Matrix

Q.52 It is the most abundant and most important photosynthetic pigment:
A. Chlorophyll "b"
B. Chlorophyll "c"
C. Chlorophyll "d"
[✓ D. Chlorophyll "a"]

Q.53 In which stage of aerobic respiration is 2-carbon molecules oxidized completely to carbon dioxide.
A. Glycolysis
[✓ B. Krebs cycle]
C. ETC
D. Calvin cycle

Q.54 Instrument which is used to measure relative abilities of different pigments to absorb different wavelengths of light is called:
A. Spectrometer
B. Barometer
C. Photometer
[✓ D. Spectrophotometer]

Q.55 Type of respiration which involves step by step breakdown of carbon chain molecules in the cell is called:
A. External respiration
B. Pulmonary respiration
[✓ C. Cellular respiration]
D. Cutaneous respiration

Q.56 End products of yeast fermentation, bacterial fermentation and anaerobic respiration are:
A. Citric acid, lactic acid, carbon dioxide and water
B. Ethyl alcohol, citric acid and carbon dioxide
[✓ C. Ethyl alcohol, lactic acid, carbon dioxide and water]
D. Methanol, lactic acid and citric acid

Q.57 Oxidative phosphorylation, synthesis of ATP in the presence of oxygen occurs in:
A. All types of cells
B. All primitive cells
C. All anaerobic cells
[✓ D. All aerobic cells]

Q.58 **One molecule of $FADH_2$ is produced in Krebs cycle during conversion of:**
A. Fumarate to Malate
B. Malate to Oxaloacetate
[✓ C. Succinate to Fumarate]
D. α-Ketoglutarate to Succinate

Q.59 **Which part of chlorophyll molecule absorbs light?**
A. Phytol
B. Pyrrole
[✓ C. Porphyrin ring]
D. Thylakoid membrane

Q.60 **Final acceptor of electrons in respiratory chain is:**
A. Cytochrome a
B. Cytochrome a_3
[✓ C. Oxygen]
D. Cytochrome c

ANSWER KEY

1	A	11	B	21	D	31	C	41	D	51	B
2	C	12	A	22	C	32	A	42	C	52	D
3	A	13	D	23	D	33	D	43	B	53	B
4	D	14	D	24	B	34	C	44	C	54	D
5	D	15	B	25	B	35	C	45	B	55	C
6	C	16	A	26	B	36	D	46	A	56	C
7	A	17	C	27	A	37	D	47	C	57	D
8	A	18	D	28	D	38	D	48	B	58	C
9	A	19	A	29	C	39	D	49	A	59	C
10	A	20	A	30	C	40	D	50	C	60	C

4 UNIT

LIFE PROCESSES (NUTRITION & GASEOUS EXCHANGE)

SELF ASSESSMENT TEST

Q.1 All insectivorous plants are:
A. Heterotrophs B. Parasitic
C. Detritivores [✓ D. Autotrophs]

Q.2 In insectivorous plants trapped insects are decomposed by:
[✓ A. Bacteria] B. Gastric enzymes
C. Fungi D. Both A & B

Q.3 Insectivorous plants get carbohydrates from:
A. Fungi [✓ B. Photosynthesis]
C. Insects D. Soil

Q.4 Carnivorous plants use insects and other small organism as their source of:
[✓ A. Nitrogen] B. Lipids
C. Carbohydrates D. N, C, Cu, Zn

Q.5 When an insect touches small sensitive hairs on the surface of the leaf of __________ plant, the lobes quickly come together with their bristles interlocked.
A. *Sarracenia pupurea* B. *Drosera intermedia*
C. Pitcher plant [✓ D. *Dionaea muscipula*]

Q.6 Which of the following is not a part of digestive system of human?
A. Liver B. Salivary glands
[✓ C. Spleen] D. Colon

Q.7 Cardiac sphincter prevents transfer of food from:
A. Pharynx to trachea B. Esophagus to stomach
[✓ C. Stomach to esophagus] D. Duodenum to stomach

Q.8 Stimulation of the parasympathetic nervous system increases:
[✓ A. Peristalsis] B. Rate of blood flow
C. Heart rate D. Breathing rate

Q.9 Where protein is completely digested?
A. Stomach B. Rectum
[✓ C. Ileum] D. Duodenum

Q.10 Defecation reflex can be consciously inhibited by:
[✓ A. Outer anal sphincter] B. Both outer and inner anal sphincters
C. Inner anal sphincter D. Cannot be inhibited

Q.11 Maximum absorption of food occurs in:
A. Buccal cavity B. Duodenum
C. Jejunum [✓ D. Ileum]

Q.12 Digestion can be defined as conversion of:
A. Soluble food into protoplasm [✓ B. Non-diffusible food into diffusible]
C. Starch into maltose D. Small food particles into large particles

Q.13 Which layer of stomach helps in churning of food?
A. Inner layer [✓ B. Outer layer]
C. Middle layer D. Basal layer

Q.14 It is common for digestive system and respiratory system:
A. Nostrils [✓ B. Pharynx]
C. Nasal cavities D. Buccal cavity

Q.15 Total number of salivary glands present in oral cavity which secret only mucus is/are:
A. 1
[✓ B. 2]
C. 4
D. 6

Q.16 Which is not associated with mucus production?
[✓ A. Parotid gland]
B. Sub-mandibular gland
C. Goblet cells
D. Sub-lingual gland

Q.17 Type of digestion which is not helpful in direct absorption of food:
[✓ A. Mechanical]
B. Biochemical
C. Chemical
D. Enzymatic

Q.18 Pyrosis or heart burning is due to inefficiency of:
[✓ A. Cardiac sphincter]
B. Pyloric sphincter
C. Esophageal sphincter
D. Colic sphincter

Q.19 In normal conditions mastication and peristalsis are under:
A. Voluntary control
[✓ B. Voluntary and involuntary control]
C. Involuntary control
D. Involuntary and voluntary control

Q.20 Liver performs the function of:
A. Conversion of glucose into glycogen
B. Deamination
C. Conversion of glycogen into glucose
[✓ D. All A, B, C]

Q.21 Alkaline nature of pancreatic juice is due to:
A. NaCl
B. KOH
[✓ C. $NaHCO_3$]
D. NaOH

Q.22 Entry of food in stomach mechanically stimulates it to produce a hormone named:
A. Gastric juice
[✓ B. Gastrin]
C. Secretin
D. Chymotrypsin

Q.23 The main function of intestinal villi is to:
A. Stimulate peristalsis
[✓ B. Provide large surface area of absorption]
C. Prevent antiperistalsis
D. Distribute digestive enzymes uniformly

Q.24 Saliva helps to convert:
A. Proteins into amino acids
[✓ B. Starch into maltose]
C. Glycogen into glucose
D. Fats into vitamins

Q.25 The lacteals are central lymph vessels which are found in:
A. Liver
[✓ B. Villi]
C. Pancreas
D. Spleen

Q.26 Bile aids in digestion and absorption of fats because it contains:
A. Lipase
✗ B. Bile pigments
[✓ C. Salts]
D. Necessary enzymes

Q.27 Enzyme of intestinal lining that converts polypeptide into dipeptides:
A. Trypsin
B. Maltase
C. Lipase
[✓ D. Amino peptidase]

Q.28 Innermost layer of stomach is also named as:
[✓ A. Mucosa]
B. Muscularis
C. Serosa
D. Adventitia

Q.29 Discontinuous feeding is possible because of:
[✓ A. Stomach]
B. Large intestine
C. Small intestine
D. Oesophagus

Q.30 Tongue is made up of:
A. Cartilage and muscles
[✓ B. Skeletal muscles]
C. Muscles and bones
D. Smooth muscles

Q.31 Which is not usually the component of faeces?
A. Dead cells
[✓ B. Lymph]
C. Microorganisms
D. Cellulose fiber

Q.32 Which of the following is not a function of large intestine?
[✓ A. Absorption of food]
B. Feces formation
C. Storage
D. Water absorption

Q.33 Oxygenated blood from lungs is carried to the heart by:
A. Pulmonary arteries
B. Coronary veins
[✓ C. Pulmonary veins]
D. Subclavian vein

Q.34 In terrestrial mammals, the movements for ventilation are governed by:
A. Abdominal muscles
B. Diaphragm
C. Skeletal muscles
[✓ D. Diaphragm and intercostal muscles]

Q.35 Residual volume in the lungs of a human during exercise is:
A. 0.5 L
[✓ B. 1 L]
C. 3 - 4.5 L
D. 1.5 L

Q.36 In human beings, CO_2 concentration in the inspired and expired air is respectively:
A. 0.01% and 5.3%
[✓ B. 0.04% and 4.0%]
C. 0.4% and 5.0%
D. 0.04% and 5.0%

Q.37 Vocal cords are ______ bands stretched across the mucous membrane in the glottis.
A. Two thick edge cartilaginous
[✓ B. Two thin edge fibrous]
C. Two thin edge muscular
D. Two pairs of thick edge fibrous

Q.38 Air is warmed as it passes through:
[✓ A. Nasal cavities]
B. Bronchi
C. Trachea
D. Alveoli

Q.39 Which of the following diverts food mass away from the opening of larynx?
A. Esophageal sphincter
[✓ B. Epiglottis]
C. Respiratory Valve
D. Soft palate

Q.40 Human lungs are spongy because of presence of millions of:
A. Bronchi
[✓ B. Alveoli]
C. Parabronchi
D. Air sacs

Q.41 Surfactant is present in:
[✓ A. Alveoli]
B. Bronchioles
C. Bronchi
D. All A, B, C

Q.42 All of the following play a protective role in respiratory passage except:
A. Macrophages
B. Ciliated epithelium
C. Hair and mucous
[✓ D. Lymphocytes]

Q.43 The decrease in pH of blood has __________ effect on the oxygen carrying capacity of haemoglobin.
A. Positive
B. No effect
[✓ C. Negative]
D. First negative than positive

Q.44 A structure that does not contain cartilage:
A. Alveolar duct
B. Alveolar sacs
C. Alveoli
[✓ D. All A, B, C]

Q.45 Smooth muscles are present in all except:

A. Trachea
B. Bronchi
C. Bronchioles
[✓ D. Alveoli]

Q.46 It is now estimated that 90% of the lung cancer is caused by:

A. Air pollution
B. Oncovirus
C. Genetically
[✓ D. Smoking]

Q.47 Each nasal cavity is divided into __________ passage ways.

A. 2
B. 4
[✓ C. 3]
D. 1

Q.48 Nasal cavity is lined with:

A. Columnar epithelium
B. Squamous epithelium
[✓ C. Ciliated epithelium]
D. Cuboidal epithelium

Q.49 Pigment present in muscles has all characteristics except:

[✓ A. Can bind with four O_2 molecules]
B. Single Haem group
C. Composed of one polypeptide chain
D. Iron is present

Q.50 Pleura is a thin membranous sac that cover lungs with:

A. Single layer
B. Triple layer
[✓ C. Double layer]
D. Pair of double layers

Q.51 How many oxygen molecules can bind to muscle haemoglobin?

A. 2
[✓ B. 4]
C. 1
D. 8

Q.52 Which of the following is not carried by haemoglobin?

A. Oxygen
[✓ B. Bicarbonate]
C. Carbon dioxide
D. Carbon monoxide

Q.53 Percentage of O_2 transported through plasma:

[✓ A. 3%]
B. 97%
C. 70%
D. 30%

Q.54 The process of bringing oxygenated air into contact with a gas exchange surface is:

[✓ A. Ventilation]
B. Gas transport
C. Photorespiration
D. Respiration

Q.55 The mode of respiration in a mammal is:

A. Mucosal
B. Cutaneous
C. Tracheal
[✓ D. Pulmonary]

Q.56 Which is the correct sequence of the air passage way in man?

A. Nasal cavity → pharynx → trachea → larynx → bronchi → bronchioles → alveoli
[✓ B. Nasal cavity → pharynx → larynx → trachea → bronchi → bronchioles → alveoli]
C. Nasal cavity → larynx → pharynx → trachea → bronchi → bronchioles → alveoli
D. Nasal cavity → larynx → bronchi → pharynx → trachea → bronchioles → alveoli

Q.57 Which of the following statement is correct?

[✓ A. Inspiration is an active process]

B. Expiration is an active process

C. Inspiration is a passive process

D. Both expiration and inspiration are passive processes

Q.58 The maximum amount of air that our lung can normally hold is:

A. Vital capacity

[✓ B. Total lung capacity]

C. Tidal capacity

D. Pulmonary capacity

Q.59 Which one of the following is capable of carrying more oxygen?

[✓ A. Blood]

B. Lymph

C. Serum

D. Plasma

Q.60 Which one is mismatched?

A. Haemoglobin —Frog

B. Heamocyanin —Mollusca

[✓ C. Haemoglobin —Snail]

D. Haemoglobin —Man

ANSWER KEY

1	D	11	D	21	C	31	B	41	A	51	B
2	A	12	B	22	B	32	A	42	D	52	B
3	B	13	B	23	B	33	C	43	C	53	A
4	A	14	B	24	B	34	D	44	D	54	A
5	D	15	B	25	B	35	B	45	D	55	D
6	C	16	A	26	C	36	B	46	D	56	B
7	C	17	A	27	D	37	B	47	C	57	A
8	A	18	A	28	A	38	A	48	C	58	B
9	C	19	B	29	A	39	B	49	A	59	A
10	A	20	D	30	B	40	B	50	C	60	C

5 UNIT

LIFE PROCESSES (TRANSPORT)

SELF ASSESSMENT TEST

Q.1 Root hair are the extensions of:
A. Pericycle
[✓ B. Epidermis]
C. Pith
D. Parenchyma

Q.2 Which of the following pathway of water conduction is interrupted by endodermis?
A. Vacuolar pathway
B. Symplast pathway
[✓ C. Apoplast pathway]
D. All A, B, C

Q.3 It separates extracellular space in root into two compartments:
A. Cortex
B. Plasmodesmata
C. Pericycle
[✓ D. Casparian strips]

Q.4 It is the main factor that is involved in uptake of water to aerial parts of plants:
A. Cohesion
[✓ B. Transpiration pull]
C. Imbibition
D. Root pressure

Q.5 During rainy season wooden doors are difficult to open and close due to:
A. Transpiration
[✓ B. Imbibition]
C. Guttation
D. Diffusion

Q.6 Plasmolysis occur due to:
A. absorption
B. Endosmosis
[✓ C. Exosmosis]
D. Osmosis

Q.7 The hormone which signals the closure of stomata is:
A. Auxins
B. Cytokinin
C. Gibberellins
[✓ D. Abscisic acid]

Q.8 According to mass flow hypothesis, mass flow of solutes from source to sink is due to:
A. Concentration gradient
[✓ B. Turgor pressure gradient]
C. Osmosis and diffusion
D. Osmosis

Q.9 The main function of guard cells is to help with:
[✓ A. Transpiration]
B. Guttation
C. Transcription
D. Respiration

Q.10 Transpiration is regulated by the movement of______.
A. Parenchyma cells
[✓ B. Guard cells]
C. Lenticels
D. Epithelial cells

Q.11 Which of the following plant material is not efficient water imbibant?
A. Lignin
[✓ B. Agar]
C. Pectin
D. Cellulose

Q.12 The rupture and fractionation do not usually occur in the water column in vessel/ tracheids during the ascent of sap because of:
[✓ A. Cohesion and adhesion]
B. Transpiration pull
C. Lignified thick wall
D. Weak gravitational pull

Q.13 Amount of blood pumped by heart into body per minute is called:
A. Atrial output
[✓ B. Cardiac output]
C. Ventricular output
D. Stroke volume

Q.14 At the time of diastole, heart is filled with:
A. Mixed blood
B. Oxygenated blood
[✓ C. Venous blood]
D. Deoxygenated blood

Q.15 Blood passes from right ventricle to lungs. It is:
A. Systemic circulation
B. Coronary circulation
[✓ C. Pulmonary circulation]
D. Atrio-venous circulation

Q.16 How many valves are present in human heart?
[✓ A. 4]
B. 3
C. 2
D. 6

Q.17 ECG is a diagnostic test for abnormality in:
[✓ A. Rhythmicity]
B. Pressure
C. Valves
D. Mixing

Q.18 If the distance between two P waves on an ECG of a person is more than the normal, what will be the possible duration of his cardiac cycle?
A. 0.2 second
B. 0.8 second
C. 0.6 second
[✓ D. 1 second]

Q.19 Which of the following is correctly matched?

		Veins	Capillaries
A.	Blood pressure	Intermediate	Low
B.	Blood flow	Intermediate	Slow
C.	Endothelial cells	No	Yes
[✓ D.]	Elasticity	Less elastic	No

Q.20 If an artery supplying blood to brain bursts as a result of high blood pressure, it will leads to:
A. Hemorrhage
B. Cerebral infarction
[✓ C. Stroke]
D. Hypertension

Q.21 Carotid artery carries:
A. Deoxygenated blood to brain
B. Oxygenated blood to heart
[✓ C. Oxygenated blood to brain]
D. Deoxygenated blood to heart

Q.22 Tricuspid valve is found in between:
A. Sinus venosus and right atrium
B. Left ventricle and left atrium
[✓ C. Right atrium and right ventricle]
D. Right ventricle and aorta

Q.23 Contraction of right ventricle pumps blood into:
A. Aorta
B. Pulmonary vein
[✓ C. Pulmonary trunk]
D. Coronary artery

Q.24 Cardiac muscles differ from skeletal muscles in their:
A. Control
B. Function
C. Structure
[✓ D. All A, B, C]

Q.25 Blood vessel that have maximum cross sectional area is:
A. Arteries
B. Vena cava
C. Veins
[✓ D. Capillaries]

Q.26 Total number of pulmonary veins in heart that carry deoxygenated blood is/are:
[✓ A. 0]
B. 2
C. 3
D. 4

Q.27 First pair of arteries arise from______ of heart.
A. Ascending aorta
B. Descending aorta
C. Abdominal aorta
[✓ D. Base of aorta]

Q.28 Deoxygenated blood will present in all of the followings except:
A. Hepatic portal vein
[✓ B. Pulmonary veins]
C. Hepatic vein
D. Pulmonary artery

Q.29 During each cardiac cycle ''Lub'' sound is produced when:
A. AV valve open
[✓ B. AV valve close]
C. SL valve close
D. Both AV & SL valve close

Q.30 Which of the following is not a normal component of interstitial fluid?
A. WBCs
B. Water
C. Dissolve gases
[✓ D. Platelets]

Q.31 Wave of blood pressure or pulse due to heart beat can be detected in:
A. Veins
[✓ B. Arteries]
C. Capillaries
D. Venule

Q.32 Blood flow through capillaries is less than:
A. 400-450mmHG
B. 1 m/s
[✓ C. 1mm/s]
D. 2 mm/s

Q.33 If fatty materials deposited inside the artery, then the condition is termed as:
A. Arteriosclerosis
B. Thrombosis
[✓ C. Atherosclerosis]
D. Embolism

Q.34 The least blood pressure can be observed in:
A. Arteries
B. Capillaries
C. Veins
[✓ D. Vena cava]

Q.35 All of the following are characters of veins except:
A. Low blood pressure
B. Valves present
C. No pulse detection
[✓ D. Have smaller bore and thin walls]

Q.36 The diameter of a blood capillary can be altered by:
A. Materials passing through it
B. Greater pressure generating by ventricular systole
[✓ C. Direct nervous stimulation or by endogenous chemicals]
D. Contraction of muscles

Q.37 The right atrium of the heart usually receives the:
[✓ A. Deoxygenated Blood]
B. Filtered Blood
C. Oxygenated Blood
D. Non-Filtered Blood

Q.38 Baroreceptors are located in/at:
[✓ A. Wall of aorta]
B. Endothelium of capillary
C. Wall of each artery
D. At the base of pulmonary vein

Q.39 S.A node is located at:
[✓ A. Upper end of right atrium]
B. Inter-ventricle septum
C. Inter-atrial septum
D. Atrio-ventricle septum

Q.40 Lymph is a fluid in transient between:
A. Lungs and blood
B. Blood and blood
[✓ C. Interstitial fluid and blood]
D. Blood cell and interstitial fluid

Q.41 All of the followings are components of lymphatic system except:
[✓ A. Liver]
B. Spleen
C. Adenoid
D. Tonsils

Q.42 Lymph nodes are not present in:
A. Axilla
B. Groins
[✓ C. Skin surface]
D. Neck

Q.43 First artery that arises from the base of aorta:
A. Pulmonary artery
B. Renal artery
[✓ C. Coronary artery]
D. Iliac artery

Q.44 **Which one is not related to cardiovascular system:**

A. Blood
B. Arteriole
C. Heart
[✓ D. Lacteal]

Q.45 **The ultimate destination of lymph is:**

A. Lymph Node
B. Lymphoid Organs
C. Lymph Capillaries
[✓ D. Subclavian vein]

Q.46 **Arteriosclerosis is:**

A. A metabolic disorder
B. An infectious disorder
[✓ C. A degenerative disorder]
D. A nutritional deficiency disorder

Q.47 **Which one of the following statements best describes the function of sinoatrial node?**

[✓ A. It sends out electrical impulses to atrial muscles causing both atria to contract]
B. It consists of small number of diffusely oriented cardiac fibers
C. It sends out electrical impulses to ventricular muscles causing both ventricles to contract
D. It is present at upper end of left atrium

Q.48 **The flow of lymph in lymphatic vessels is maintained by:**

A. Heart, activity of smooth muscles and valves
B. Activity of skeletal muscles, heart and breathing movements
[✓ C. Breathing movements, activity of skeletal muscles and valves]
D. Exercise, breathing movements and heart

Q.49 **Thymus gland is involved in maturation of:**

A. Platelets
B. Eosinophils
C. B-Lymphocytes
[✓ D. T-Lymphocytes]

Q.50 **Mucous membranes are part of body defense system and they offer:**

[✓ A. Physical Barriers]
B. Chemical Barriers
C. Mechanical Barriers
D. Biological Barriers

Q.51 **The immunity in which T-cells recognize the antigens or micro-organisms is known as:**

A. Tissue Grafting
[✓ B. Cell Mediated Immunity / Response]
C. Phagocytosis
D. Hormonal Immunity / Response

Q.52 **In passive immunity which of the following component are injected into blood:**

A. Antigens
B. Serum
C. Immunogens
[✓ D. Immunoglobulins]

Q.53 **Antigen is a foreign protein or any other molecule which stimulates the formation of**

A. MC complex
B. Mucus
C. Immunogen
[✓ D. Antibodies]

Q.54 **Skin and mucous membranes are part of the body defense system and they form the**

[✓ A. Physical barrier]
B. Chemical barriers
C. Mechanical barriers
D. Biological barriers

Q.55 Which part of the antibody recognizes the antigen during immune response?

A. Heavy part

B. Light part

[✓ C. Variable part]

D. Consonant part

Q.56 Phagocytes generally come into action when:

[✓ A. 1st defense line is breached]

B. Infection is over

C. Parasites enter the body

D. Lymphocytes fail

Q.57 Study of mechanisms of body defense is called:

[✓ A. Immunology]

B. Teratology

C. Serology

D. Microbiology

Q.58 Which one which is not involved in immunity?

A. T-lymphocytes

B. B-lymphocytes

C. Antibodies

[✓ D. Myoglobin]

Q.59 Immune system is an example of:

A. 1st line of defense

[✓ B. 3rd line of defense]

C. 2nd line of defense

D. 4th line of defense

Q.60 Antibodies are involved in:

A. 1st line of defense

[✓ B. 3rd line of defense]

C. 2nd line of defense

D. 4th line of defense

ANSWER KEY

1	B	11	B	21	C	31	B	41	A	51	B
2	C	12	A	22	C	32	C	42	C	52	D
3	D	13	B	23	C	33	C	43	C	53	D
4	B	14	C	24	D	34	D	44	D	54	A
5	B	15	C	25	D	35	D	45	D	55	C
6	C	16	A	26	A	36	C	46	C	56	A
7	D	17	A	27	D	37	A	47	A	57	A
8	B	18	D	28	B	38	A	48	C	58	D
9	A	19	D	29	B	39	A	49	D	59	B
10	B	20	C	30	D	40	C	50	A	60	B

6 UNIT

COORDINATION & CONTROL
NERVOUS & CHEMICAL COORDINATION

SELF ASSESSMENT TEST

Q.1 Dwarfism is a hormonal disorder due to:

A. Deficiency of thyroxin
[✓ B. Deficiency of STH]
C. Excess of thyroxin
D. Deficiency of insulin

Q.2 What is the essential character for a substance categorized as hormone?

[✓ A. Organic nature]
B. Proteins
C. Transportation by duct
D. Production throughout life

Q.3 Function of ACTH is to:

A. Stimulate pituitary gland
B. Stimulate adrenal medulla
[✓ C. Stimulate adrenal cortex]
D. Stimulate thyroid gland

Q.4 Corpus luteum produces:

[✓ A. Progesterone]
B. Estrogen
C. Cortisol
D. Testosterone

Q.5 Hormones can regulate other hormones through:

A. Competition
[✓ B. Feedback]
C. Inhibition
D. Antagonizing

Q.6 A patient who excretes large quantity of sodium in urine has:

A. Diseased adrenal medulla
B. Diseased pancreas
[✓ C. Diseased adrenal cortex]
D. Diseased thymus

Q.7 Chorionic gonadotropic hormone is secreted by:

A. Ovary
B. Uterus
C. Pituitary
[✓ D. Placenta]

Q.8 Besides testes, androgens are also produced by:

A. Thyroid
B. Adrenal medulla
C. Thymus
[✓ D. Adrenal cortex]

Q.9 Glucagon is secreted from which cells of islet of Langerhans?

[✓ A. α-cells]
B. γ-cells
C. β-cells
D. Both α and β cells

Q.10 Which is not a ductless gland?

A. Testis
[✓ B. Sub-maxillary]
C. Ovary
D. Parathyroid

Q.11 Secretion of estrogen is under the control of:

[✓ A. FSH]
B. LH
C. Progesterone
D. STH

Q.12 The secretion of gastric juice is stimulated by:

A. Secretin
[✓ B. Gastrin]
C. Adrenaline
D. Corticosterone

Q.13 It is secreted as a result of distension of cervix:

A. ADH
[✓ B. Oxytocin]
C. Thyroxin
D. MSH

Q.14 Diabetes insipidus is due to less secretion of:

[✓ A. Vasopressin]
B. Thyroxine
C. Insulin
D. Progesterone

Q.15 Which of the following develops secondary male characteristics?

[✓ A. Androgens]
B. Adrenaline
C. Epinephrine
D. Aldosterone

Q.16 Chemical nature of LH and ICSH is:
A. Steroids
B. Tyrosine derivatives
[✓ C. Polypeptides]
D. Amino acids

Q.17 Addison's disease can be due to all reasons except:
A. Hypothalamus
B. Pituitary gland
C. Adrenal cortex
[✓ D. Adrenal medulla]

Q.18 Which one causes release of pancreatic exocrine secretion?
A. Glucose
[✓ B. Secretin]
C. Gastrin
D. Bile

Q.19 Vasodilation in muscles is done by the action of:
A. Norepinephrine
B. Cortisol
[✓ C. Epinephrine]
D. Glucagon

Q.20 Milk production is the function of:
A. Oxytocin
[✓ B. Prolactin]
C. ADH
D. LH

Q.21 Which part of neuron may act as receptor as well?
[✓ A. Dendrite]
B. Cell body
C. Axon
D. Ganglion

Q.22 It acts as relay neuron:
A. Sensory
[✓ B. Associative]
C. Motor
D. Uni-polar

Q.23 Which of the following is not the part of forebrain?
A. Thalamus
B. Amygdala
C. Hippocampus
[✓ D. Pituitary]

Q.24 Identify the incorrect statement about saltatory nerve impulse:
A. Faster conduction of impulse
B. Action potential jumps from node to node
C. Only occurs in myelinated neurons
[✓ D. Characteristic of all neurons]

Q.25 White matter in central nervous system is composed of:
A. Nerve cells
B. Non-myelinated nerve fibers
[✓ C. Myelinated nerve fibers]
D. Connective

Q.26 Myelin sheath is the mainly present in:
A. Dendrites
B. Soma
[✓ C. Axon]
D. Cell body

Q.27 The function of nervous tissue is:
A. Irritability
B. Responsiveness
C. Sensitivity
[✓ D. All A, B, C]

Q.28 The neuroglia plays a vital role in:
A. Nutrition of neuron
B. Protection by myelin sheath
C. Cell division
[✓ D. Both A, C]

Q.29 Thermoregulatory centre in the body is found in:
A. Skin
[✓ B. Hypothalamus]
C. Adrenal Gland
D. Pituitary

Q.30 Motor neurons carry message from associative neurons to:
A. Skeletal muscles
B. Cardiac muscles
C. Smooth muscles
[✓ D. All A, B, C]

Q.31 The type of receptors present in the hypothalamus are:
A. Mechanoreceptors
[✓ B. Chemoreceptors]
C. Photoreceptors
D. Pressure receptors

Q.32 The groups of ribosomes associated with RER in a neuron:
A. Meissner's corpuscles
[✓ B. Nissl's granules]
C. Pacinian corpuscles
D. Dorsal root ganglion

Q.33 Part of motor neuron which makes synapse with sarcolemma is:
A. Motor unit
[✓ B. Axon]
C. Dendron
D. Dendron and axon

Q.34 How many sensations are detected by skin?
A. 5
B. 4
[✓ C. 3]
D. 2

Q.35 The main neurotransmitter for synapses that lies outside the CNS is:
A. Adrenaline
B. Serotonin
C. Dopamine
[✓ D. Acetylcholine]

Q.36 How many binding sites for Na^+ and K^+ are present in Na^+–K^+ pump, respectively?
A. 1, 2
B. 2, 1
C. 2, 3
[✓ D. 3, 2]

Q.37 Which of the following membrane potential depicts hyperpolarization?
A. -50mV
[✓ B. -90mV]
C. +50mV
D. -70mV

Q.38 Spiny look of neurons is due to their:
A. Myelin sheath
B. Axon
C. Dendron
[✓ D. Dendrites]

Q.39 These are the structures which respond when they are stimulated by an impulse coming through motor neuron:
[✓ A. Glands]
B. Thermo-receptors
C. Sensory neurons
D. Pacinian corpuscles

Q.40 CNS was first developed in:
A. Cnidarians
[✓ B. Platyhelminthes]
C. Chordates
D. Mammals

Q.41 Which of the following is not the part of forebrain?
[✓ A. Reticular formation]
B. Amygdala
C. Hippocampus
D. Thalamus

Q.42 Our most unconscious behaviors are controlled by:
A. Thalamus
[✓ B. Limbic system]
C. Cranial nerves
D. Cerebral cortex

Q.43 One that connects both cerebral hemispheres is called
A. Corpus luteum
B. Corpus striatum
[✓ C. Corpus callosum]
D. Tracts

Q.44 Thermostat in body is located in:
A. CNS
[✓ B. Hypothalamus]
C. Thyroid glands
D. Skin vessels

Q.45 Medulla oblongata is located
A. In front of Cerebrum, below midbrain
B. In front of cerebellum, above pons
[✓ C. Between spinal cord and pons]
D. In front of pons, above cerebellum

Q.46 Stimulation of vagus nerve will cause
A. Increase blood pressure
[✓ B. Decreased heart rate]
C. Increased blood flow to limbs
D. Dilation of pupil of eye

Q.47 Hormones are secretions of
[✓ A. Endocrine glands only]
B. All glands
C. Exocrine glands only
D. All cellular secretions

Q.48 During Addison's disease
A. MSH and cortical hormones increases
[✓ B. MSH increases, cortical hormones decreases]
C. MSH and cortical hormones decreases
D. MSH decreases, cortical hormones increases

Q.49 Pineal gland is located in/at
A. Spinal canal
[✓ B. Brain]
C. Neck
D. Stomach mucosa

Q.50 Deficiency of sex hormones in a female will result in
A. Fertility
[✓ B. Failure to mature sexually]
C. Oogenesis
D. Secondary sex characteristics development

Q.51 An effect of progesterone on ovary is to
A. Thicken and vascularize it
[✓ B. Prevent ripening of follicles]
C. Ovulation
D. Placenta formation

Q.52 A male body tends more towards the form of immature female after
A. Spermiogenesis
[✓ B. Castration]
C. Deficiency of dopamine
D. Hypergonadism

Q.53 How many parathyroid glands are present in our body
A. 1
B. 3
C. 2
[✓ D. 4]

Q.54 Rickets will be caused due to which hormonal abnormality
A. No exposure to sunlight
[✓ B. PTH excess]
C. Vitamin D excess
D. LTH absence

Q.55 Glucagon increases blood glucose level by all means except
A. Converting glycogen to glucose
B. Increasing Hydrolysis of glycogen
C. Converting fats to glucose
[✓ D. Increasing Glycolysis]

Q.56 A hormone is an:
A. Enzyme
B. Excretory product
[✓ C. Organic compound]
D. Inorganic compound

Q.57 All are amino acid derivatives except:
A. Thyroxin
[✓ B. Aldosterone]
C. Epinephrine
D. Nor-adrenalin

Q.58 Insulin and glucagon are:
[✓ A. Proteins]
B. Polypeptides
C. Amino acid derivatives
D. Steroids

Q.59 The primary function of spinal cord is to:
A. Produce CSF
B. Produce hormones
C. Communicate two hemispheres
[✓ D. Communicate brain with rest of body]

Q.60 These contain cell bodies of neurons:
A. Gray and white matter
[✓ B. Ganglia and gray matter]
C. Nerve and ganglia
D. Nerve and white matter

ANSWER KEY

1	B	11	A	21	A	31	B	41	A	51	B
2	A	12	B	22	B	32	B	42	B	52	B
3	C	13	B	23	D	33	B	43	C	53	D
4	A	14	A	24	D	34	C	44	B	54	B
5	B	15	A	25	C	35	D	45	C	55	D
6	C	16	C	26	C	36	D	46	B	56	C
7	D	17	D	27	D	37	B	47	A	57	B
8	D	18	B	28	D	38	D	48	B	58	A
9	A	19	C	29	B	39	A	49	B	59	D
10	B	20	B	30	D	40	B	50	B	60	B

7 UNIT

REPRODUCTION SUPPORT AND MOVEMENT

SELF ASSESSMENT TEST

Q.1 Each myosin molecule has one tail and:

A.3 globular heads
[✓ B. 2 globular heads]
C. 1 globular head
D. No globular head11

Q.2 The protein filament which binds to the calcium:

A. Actin
B. Myosin
[✓ C. Troponin]
D. Tropomyosin

Q.3 Twisting around the actin chains there are two strands of another protein:

A. Myosin
[✓ B. Tropomyosin]
C. Troponin
D. Creatine

Q.4 Majority of muscles of our body are:

A. Smooth
B. Cardiac
[✓ C. Skeletal]
D. None of these

Q.5 Muscle is made up of many cells which are referred to as:

A. Myofilaments
B. Sarcolemma
C. Myofibrils
[✓ D. Muscles Fiber]

Q.6 Each muscle fibre is surrounded by membrane which is called:

A. Sarcomere
B. Twitch fibre
[✓ C. Sarcolemma]
D. Capsule

Q.7 During muscle contraction:

[✓ A. I-band shortens]
B. Actin filaments shorten
C. Myosin filaments shorten
D. Z-line disappears

Q.8 When calcium ions are released from the sarcoplasmic reticulum they bind with ________ during muscle contraction.

A. Tropomyosin
B. Cytosol's ions
C. Sarcolemma
[✓ D. Troponin]

Q.9 During muscle contraction:

[✓ A. I-band shortens]
B. Actin filaments shorten
C. Myosin filaments shorten
D. Z-line disappears

Q.10 The sliding protein of muscle:

A. Tubulin
B. Myoglobin
C. Myosin
[✓ D. Actin]

Q.11 The pigment which stores oxygen in muscles is:

A. Hemoglobin
B. Myosin
[✓ C. Myoglobin]
D. Actinomyosin

Q.12 The length of myofibril from one Z-band to the next Z-band is known as:

[✓ A. Sarcomere]
B. Sarcoplasm
C. Sarcolemma
D. Muscle Fiber

Q.13 Calcium ions released during a muscle fiber contraction attach with:

A. Myosin
B. Tropomyosin
C. Actin
[✓ D. Troponin]

Q.14 Visceral muscles are also called as smooth muscles because they:

A. Don't contain muscle proteins
B. Don't have multiple nuclei
[✓ C. Don't have striations]
D. Help in peristalsis

Q.15 Cross bridges are the part of:
A. Actin
B. Troponin
C. Tropomyosin
[✓ D. Myosin]

Q.16 Regarding skeletal muscle structure, the area which contains only thick filaments:
A. A-band
B. I-band
[✓ C. H-zone]
D. Z-line

Q.17 For muscle contraction, calcium ions in sarcoplasm are released from:
A. T-tubule
B. Mitochondria
[✓ C. Sarcoplasmic reticulum]
D. Myosin filament

Q.18 Which of the following is structural unit of skeletal muscles?
A. Myofilament
[✓ B. Muscle fiber]
C. Myofibril
D. Sarcomere

Q.19 Myoglobin is found in:
A. Blood
B. Spleen
C. Bones
[✓ D. Muscles]

Q.20 Sarcomere is an area between:
A. Two I-bands
[✓ B. Two Z-lines]
C. A and I-bands
D. Z and H-bands

Q.21 The smallest contractile part of a skeletal muscle is:
A. Myofilament
B. Myofibre
C. Microfilament
[✓ D. Sarcomere]

Q.22 Which of the following protein starts muscle contraction by binding with Ca^{+2}?
A. Myosin
[✓ B. Troponin]
C. Tropomyosin
D. Actin

Q.23 Which band does not change its length during muscle contraction?
A. I-band
B. Two Z-lines
[✓ C. A-band]
D. A and I-bands

Q.24 T-tubules in skeletal muscles are formed by:
A. SER
[✓ B. Sarcolemma]
C. RER and SER
D. Cytoplasm

Q.25 Bones protect critical internal organs like:
[✓ A. Brain, spinal cord, heart]
B. Brain, all nerves, spinal cord
C. Heart, stomach, eyes
D. Spinal cord, pinna of ears, lungs

Q.26 A statement not true about bones and cartilages:
A. Both contain living cells
[✓ B. Both contain same type of living cells]
C. Both have ground matrix of collagen
D. Both are part of endoskeleton

Q.27 Total number of "Free Ribs" in human body is:
A. 1
[✓ B. 4]
C. 2
D. 8

Q.28 Knee and elbow joints are examples of:
A. Ball and socket joint
B. Cartilaginous joint
[✓ C. Hinge joint]
D. Fibrous joint

Q.29 Which of the followings are characteristics of Visceral muscles except?
A. Contain muscle proteins
B. Have multiple nuclei
[✓ C. Have striations]
D. Help in peristalsis

Q.30 How many unpaired bones are found in skull?
A. 5
[✓ B. 6]
C. 14
D. 22

Q.31 Sertoli cells are under control of:
A. LH
[✓ B. FSH]
C. ICSH
D. Testosterone

Q.32 Sperm production in humans is:
A. Periodic process
[✓ B. Continuous process]
C. Cyclic process
D. Discontinuous process

Q.33 It is the correct passage of sperms from testes to outside:
A. Seminiferous tubules → Sperm duct → Epididymis → Urethra
B. Sperm duct → Seminiferous tubule → Epididymis → Urethra
C. Epididymis → Seminiferous tubule → Sperm duct → Urethra
[✓ D. Seminiferous tubules → Epididymis → Sperm duct → Urethra]

Q.34 Pick an incorrectly matched pair regarding males:
A. Epididymis – sperms storage
B. Scrotum – thermoregulation
[✓ C. Urethra – carries urine only]
D. Testes – testosterone production

Q.35 Glands of male reproductive system are:
[✓ A. Prostate and seminal vesicle]
B. Seminal vesicles and Corpus luteum
C. Prostate and Corpus luteum
D. Prostate and Placenta

Q.36 The main duct of male reproductive tract is:
A. Epididymis
B. Seminiferous tubules
[✓ C. Vas deferens]
D. Vasa efferentia

Q.37 Highly convoluted duct is:
A. Vas deferens
B. Sperm duct
[✓ C. Epididymis]
D. Urinogenital duct

Q.38 New born does not acquire eye infection in:
A. Syphilis
B. Genital herpes
[✓ C. AIDS]
D. Gonorrhea

Q.39 The bacteria that infect the mucous membranes of urinogenital tract is:
A. *Clostridium tetani*
[✓ B. *Treponema pallidum*]
C. *Neisseria gonorrhea*
D. *Staphylococcus aureus*

Q.40 Ulcers in reproductive tracts are formed in:
A. Gonorrhea
B. Syphilis
C. AIDS
[✓ D. Genital herpes]

Q.41 Genital herpes is caused by Herpes simplex type:
A. I
[✓ B. II]
C. III
D. IV

Q.42 In a menstrual cycle of 24 days, which of the following will be day of ovulation?
A. 14th day
B. 7th day
[✓ C. 10th day]
D. 6th day

Q.43 Peak level of LH corresponds with:
A. Oogenesis
B. Fertilization
[✓ C. Ovulation]
D. Menstruation

Q.44 The end or complete stop of the menstrual cycle is called:
A. Andropause
[✓ B. Menopause]
C. Menstruation
D. Menarche

Q.45 Follicular atresia is the degeneration of:
A. Primary oocyte
B. 1st polar body
[✓ C. Primary follicles]
D. 2nd polar body

Q.46 Menstrual cycle begins with:
A. Proliferative phase
B. Ovulatory phase
[✓ C. Menstrual phase]
D. Secretory phase

Q.47 FSH in males acts on:
[✓ A. Germinal epithelium]
B. Simple epithelium
C. Interstitial cells
D. Germinal endothelium

Q.48 Menstrual cycle is generally of:
A. 21 days
B. 30 days
[✓ C. 28 days]
D. 40 days

Q.49 Progesterone level is increased in all conditions except:
A. Gestation
B. Luteal phase
C. Pregnancy
[✓ D. Menstruation]

Q.50 Structure that is formed at the site of ovulation:
A. Placenta
B. Graffian follicle
[✓ C. Corpus luteum]
D. Primary Oocyte

Q.51 Oviduct in females opens into:
A. Fallopian tube
[✓ B. Uterus]
C. Ovary
D. Cervix

Q.52 The oocyte released during ovulation is in:
A. Anaphase I
B. Metaphase I
C. Prophase I
[✓ D. Metaphase II]

Q.53 Fertilization in humans occurs in:
A. Uterus
[✓ B. Fallopian tube]
C. Vagina
D. Urethra

Q.54 Primary oocyte is:
[✓ A. Diploid]
B. Polyploid
C. Haploid
D. Monoploid

Q.55 From the conversation of diploid oocyte to the mature egg formation how many polar bodies are formed?
A. 1
B. 2
[✓ C. 3]
D. 4

Q.56 Implantation of zygote occurs at:
A. Oviduct
B. Uterine tube
[✓ C. Uterus]
D. Cervix

Q.57 Which one of the following is not a part of female reproductive system?

A. Urethra
B. Vagina
C. Cervix
D. Uterus

Q.58 Oogenesis in human females start:

A. At puberty
B. Before birth
C. Before puberty
D. After puberty

Q.59 Uterus opens into vagina through a narrow entrance that is:

A. Cervix
B. Birth canal
C. Fallopian tube
D. Uterine body

Q.60 First polar body is formed as a result of:

A. Differentiation of oocyte
B. 1st meiotic division in primary oocyte
C. Mitotic cell division in spermatocytes
D. 2nd meiotic division in primary oocyte

ANSWER KEY

1	B	11	C	21	D	31	B	41	B	51	B
2	C	12	A	22	B	32	B	42	C	52	D
3	B	13	D	23	C	33	D	43	C	53	B
4	C	14	C	24	B	34	C	44	B	54	A
5	D	15	D	25	A	35	A	45	C	55	C
6	C	16	C	26	B	36	C	46	C	56	C
7	A	17	C	27	B	37	C	47	A	57	A
8	D	18	B	28	C	38	C	48	C	58	B
9	A	19	D	29	C	39	B	49	D	59	A
10	D	20	B	30	B	40	D	50	C	60	B

8 UNIT

BIO-DIVERSITY (ACELLULAR LIFE/VARIETY OF LIFE) PROKARYOTES

SELF ASSESSMENT TEST

Q.1 **In which step of life cycle of bacteriophage, tail releases enzyme lysozyme?**
A. Attachment B. Adsorption
[✓ C. Penetration] D. Injection

Q.2 **Bacteriophage is an example of:**
[✓ A. Obligate intracellular parasite] B. Obligate ectoparasite
C. Facultative intracellular parasite D. Facultative endoparasite

Q.3 **It is an RNA non-enveloped virus:**
[✓ A. Poliovirus] B. Pox virus
C. Influenza virus D. Herpes virus

Q.4 **Which of the following is common waste material in bacteria?**
[✓ A. Acetic acid] B. Sulphur
C. Glycogen D. Phosphate

Q.5 **Unifying character of all bacteria:**
A. Peptidoglycan B. Conjugation
[✓ C. Haploid] D. Capsule

Q.6 **When cocci form long chain of cells then arrangement is called:**
A. Diplococci B. Sarcina
[✓ C. Streptococci] D. Staphylococci

Q.7 **Which of the following is commonly present in all bacteria?**
[✓ A. Nucleoid] B. Pili
C. Plasmid D. Cell wall

Q.8 **Type of glycocalyx that loosely attached to bacterial cell is called as:**
A. Cell wall B. Capsule
[✓ C. Slime] D. Cell membrane

Q.9 **The particles which don't have nucleic acid as their hereditary material:**
A. Virions [✓ B. Prions]
C. Viroids D. Non-enveloped viruses

Q.10 **Capsomeres present in viral capsid are:**
A. Amino acids [✓ B. Protein fragments]
C. Fatty acids D. Peptidoglycans

Q.11 **Pathogenicity of bacteriophage is due to its:**
A. Envelope B. Tail
[✓ C. Nucleic acid] D. Capsid

Q.12 **Bacteria cannot survive in a highly salted pickle because of:**
A. Osmotic lysis [✓ B. Plasmolysis & killing]
C. Inability to do photosynthesis D. Lack of supply of nutrients

Q.13 **Antibiotics are mostly obtained from:**
[✓ A. Bacteria] B. Angiosperms
C. Viruses D. Fungi

Q.14 **Plasmids are:**
A. Viruses [✓ B. Circular DNA]
C. Restriction enzymes D. Single stranded DNA

Q.15 Some complex bacterial cells have:
[✓ A. Mesosomes]
B. Mitochondria
C. Golgi bodies
D. Chloroplast

Q.16 The uniqueness of bacterial photosynthesis is because it can occur:
A. Without CO_2
[✓ B. Without chlorophyll a]
C. Without pigment
D. Without light

Q.17 Gram positive bacteria differ from Gram negative bacteria in the structure of their:
A. Nucleoid
[✓ B. Cell wall]
C. Cytoplasm
D. Ribosomes

Q.18 Bacteria which need oxygen but can also live in the absence of oxygen are:
A. Obligate aerobes
B. Obligate anaerobes
C. Microaerophilic
[✓ D. Facultative anaerobes]

Q.19 The flagella of bacteria are composed of:
A. Carbohydrate
B. Tubulin
C. Lipid
[✓ D. Flagellin]

Q.20 Nitrogen fixing organism which can be symbiotic is:
A. Dinoflagellates
B. Liverworts
[✓ C. *Rhizobium*]
D. Moss

Q.21 Bacterial ribosomes lie in/on:
[✓ A. Cytoplasm]
B. Nuclear membrane
C. RER
D. Cell wall

Q.22 Mouth, lips and skin are affected due to the infection of:
A. Pox virus
[✓ B. Herpes virus]
C. Paramyxovirus
D. Adenovirus

Q.23 Tumor causing virus is:
A. DNA enveloped
B. DNA non-enveloped
[✓ C. RNA enveloped]
D. RNA non-enveloped

Q.24 AIDS will lead to:
A. Liver cirrhosis
[✓ B. Opportunistic infections]
C. Mental retardation
D. Angina

Q.25 Which of the following are the smallest bacteria?
A. *E. coli*
[✓ B. *Mycoplasma*]
C. Spirochete
D. *Streptococci*

Q.26 Plasma membrane and everything in it is called:
A. Leucoplast
B. Phragmoplast
[✓ C. Protoplast]
D. Cytoplasm

Q.27 Mad cow infection is caused by:
A. DNA
[✓ B. Prion]
C. Cowpox virus
D. mRNA

Q.28 Hepatitis A and E is transmitted by contact with ________ from infected individuals.
A. Serum
B. Blood
[✓ C. Faeces]
D. Saliva

Q.29 HIV is classified as:
[✓ A. Retrovirus]
B. Bacteriophage
C. Oncovirus
D. DNA virus

Q.30 **Number of capsomeres present in adenovirus and herpes virus are ______ and ______ respectively.**
A. 225, 162
B. 522, 161
[✓ C. 252, 162]
D. 252, 126

Q.31 **Viruses can infect and parasitize ________.**
A. Mammals
B. Humans
C. Bacteria
[✓ D. All of these]

Q.32 **Which one is not a living character of virus?**
A. Mutation
B. Genome
C. Replication
[✓ D. Crystallization]

Q.33 **Viruses belongs to:**
A. Prokaryotes
B. Eukaryotes
C. Fungi
[✓ D. Acellular]

Q.34 **Stanley crystallized _____.**
A. HIV
[✓ B. TMV]
C. HBV
D. T2

Q.35 **Which one is rod shaped virus?**
A. Polio
B. HIV
C. Herpes
[✓ D. TMV]

Q.36 **Phage attached to bacterial cell surface by its:**
A. Sheath
B. Core
C. Head
[✓ D. Tail]

Q.37 **Which process/es take/s place during lytic cycle?**
A. Replication
B. Transcription
C. Translation
[✓ D. All of these]

Q.38 **HIV can be transmitted by all of the followings except:**
A. Blood transfusion
B. Sexual contact
[✓ C. Saliva]
D. Contaminated syringes

Q.39 **Pick the false statement about AIDS:**
A. HIV infection
B. Reverse transcription
C. Destruction of T cells
[✓ D. Cure after proper medication]

Q.40 **Virus attacks and hijacks host's __________.**
A. Mitochondria
B. Nucleus
[✓ C. Ribosomes]
D. Endoplasmic reticulum

Q.41 **It is anti-viral:**
A. Penicillin
B. Streptomycin
C. Tetracycline
[✓ D. Interferon]

Q.42 **__________ is the second major form of hepatitis:**
A. Hepatitis A
[✓ B. Hepatitis B]
C. Hepatitis C
D. Hepatitis D

Q.43 **Bacteria and cyanobacteria very closely resemble in their:**
A. Mode of nutrition
B. Mode of respiration
C. Pigment composition
[✓ D. Cell wall composition]

Q.44 **Which structure is involved in transfer of genetic material from one bacterium to other?**
A. Flagella
[✓ B. Pilli]
C. Cytoplasm
D. Mesosomes

Q.45 ***Salmonella typhi* exhibit which shape?**

A. Spherical
B. Spiral
[✓ C. Rod-shape]
D. Comma-shape

Q.46 Cell membrane of bacteria in function resembles which of the eukaryotic organelle?

A. Chloroplast
[✓ B. Mitochondria]
C. Nucleus
D. Endoplasmic reticulum

Q.47 All of followings bacteria has definite shape except:

A. *Clostridium tetani*
B. *Spirillum*
C. *Salmonella typhi*
[✓ D. *Mycoplasma*]

Q.48 The major cell infected by the HIV is:

A. Leucocyte
[✓ B. Helper T-lymphocyte]
C. Monocyte
D. B-lymphocyte

Q.49 Chemically, viruses are made up of:

A. Nucleic acid only
[✓ B. Nucleic acid and protein]
C. Protein only
D. Core and coat

Q.50 Reverse transcriptase is used to make DNA copies of:

A. Host RNA
B. Host DNA
[✓ C. Viral RNA]
D. Viral DNA

Q.51 Antibiotics act against:

[✓ A. Bacterial Diseases]
B. Bacterial and Viral Diseases
C. Allergies
D. Viral Diseases

Q.52 The entire cell wall of bacteria is often regarded as a single huge molecule or molecular complex called ________

A. Capsule
B. Slime capsule
C. Secondary wall
[✓ D. Sacculus]

Q.53 When the division of cells is in three planes, the arrangement is known as:

A. Diplococcus
B. Streptococcus
[✓ C. Sarcina]
D. Staphylococcus

Q.54 Which of the following contains peptidoglycan cell wall?

A. *Penicillium*
B. *Adiantum*
[✓ C. Bacterium]
D. *Polytrichum*

Q.55 Antibiotics that kill microbes immediately are called________.

A. Microbistatic
B. Biostatic
[✓ C. Microbicidal]
D. Chemotherapeutic

Q.56 Mesosomes are infoldings of the cell membrane and are involved in:

[✓ A. DNA replication]
B. Protein synthesis
C. RNA synthesis
D. Metabolism

Q.57 **Which statement about bacteria is true:**
A. Gram positive bacteria have more lipids in their cell wall
B. Gram negative bacteria have more lipids in their cell wall
C. Lipids are absent in cell wall of both gram positive and negative bacteria
D. Both have equal amount of lipids

Q.58 **All of the followings are enveloped viruses except:**
A. Bacteriophage
B. Pox virus
C. Influenza
D. HIV

Q.59 **______ virus have its receptor sites on bacterial cell wall.**
A. HIV
B. Polio
C. Bacteriophage
D. Influenza

Q.60 **Which of the following is correct statement about HIV?**
A. Double stranded DNA virus
B. Single stranded RNA virus
C. DNA enveloped virus
D. Cause cancer

ANSWER KEY

1	C	11	C	21	A	31	D	41	D	51	A
2	A	12	B	22	B	32	D	42	B	52	D
3	A	13	A	23	C	33	D	43	D	53	C
4	A	14	B	24	B	34	B	44	B	54	C
5	C	15	A	25	B	35	D	45	C	55	C
6	C	16	B	26	C	36	D	46	B	56	A
7	A	17	B	27	B	37	D	47	D	57	B
8	C	18	D	28	C	38	C	48	B	58	A
9	B	19	D	29	A	39	D	49	B	59	C
10	B	20	C	30	C	40	C	50	C	60	B

9 UNIT

DIVERSITY AMONG ANIMALS

SELF ASSESSMENT TEST

Q.1 Direct ancestors of grade radiata are:
A. Parazoa
B. Porifera
C. Protozoa
[✓ D. Eumetazoa]

Q.2 All are characteristics of molluscs except:
A. Soft bodied
B. Triploblast
C. Bilateral symmetry
[✓ D. Pseudocoelomates]

Q.3 Radial cleavage can be observed in:
A. Cnidaria
[✓ B. Human]
C. Arthropoda
D. Annelida

Q.4 Body cavity is truly divided in all of the following except:
A. Molluscs
B. Arthropods
C. Annelids
[✓ D. Round worms]

Q.5 Pseudocoelom develops from:
A. Blastopore lip
B. Embryonic mesoderm
C. Archenteron
[✓ D. Blastocoel]

Q.6 Highly organized mesoderm represents:
[✓ A. Complex organ formation]
B. Radial symmetry
C. Simple organ formation
D. Bilateral symmetry

Q.7 Which of the following is the outer layer of mesoderm?
[✓ A. Parietal]
B. Viseral
C. Intestinal
D. Muscular

Q.8 In animals reproductive system developed from:
A. Ectoderm
B. Blastoderm
[✓ C. Mesoderm]
D. Endoderm

Q.9 Which one of the following is correct about parazoa?
A. Radial symmetry
B. Triploblastic organization
[✓ C. Indeterminate shape]
D. Indeterminate cleavage

Q.10 During embryonic development mouth is formed at some distance anterior to the blastopore and blastopore forms anus in:
[✓ A. Echinoderms]
B. Mollusca
C. Nematoda
D. Aschelminthes

Q.11 Sac like digestive system is present in:
A. Cnidarian
[✓ B. Platyhelminthes]
C. Arthropoda
D. Chordates

Q.12 Which one of the following is an example of radial organism?
A. Planaria
B. Human
[✓ C. Sea anemone]
D. Insects

Q.13 Which of the following do not have a body cavity?
A. Pseudocoelomata.
B. Coelomata.
[✓ C. Acoelomata.]
D. None of these

Q.14 Sharks and rays are included in class:
A. Cyclostomata
B. Osteichthyes.
[✓ C. Chondrichthyes]
D. Tetrapoda

Q.15 Which of the following does not have specialized respiratory organs?

[✓ A. *Hydra*]
B. Cockroach.
C. Birds
D. Both A and B

Q.16 Name the vertebrates which are without jaws.

A. Osteichthyes.
B. Chondrichthyes.
[✓ C. Cyclostomata.]
D. None of these.

Q.17 Coelem is a cavity lined by:

[✓ A. Mesoderm]
B. Epiderm
C. Endoderm
D. Ectoderm

Q.18 It is an endoparasite of humans, cattle and pig that completes its life cycle in two hosts:

[✓ A. Tapeworm]
B. Liver fluke
C. Aurelia
D. Planaria

Q.19 Tse-tse fly causes the sleeping sickness and skin diseases by transmitting:

A. *Plasmodium*
B. *Anopheles*
[✓ C. *Trypanosoma*]
D. Insects

Q.20 Book lungs are present in arthropods for exchange of gases in class:

A. Crustacea
B. Myriapoda
C. Insecta
[✓ D. Arachnida]

Q.21 Larvae of which group are similar to chordates?

[✓ A. Echinodermata]
B. Arthropoda
C. Annelida
D. Nematoda

Q.22 A parasite living inside body of the host is called:

A. Ectoparasite
B. Facultative parasite
C. Obligate parasite
[✓ D. Endoparasite]

Q.23 Which of the following is exclusive character of mammals?

A. Homeothermic
B. Poikliothermic
[✓ C. Hair]
D. Four chambered heart

Q.24 The nervous system develops from which of the following layer during embryonic development of animals?

A. Mesoderm
B. Endoderm
[✓ C. Ectoderm]
D. Mesoderm and Endoderm

Q.25 Fasciola is endoparasite of:

A. Colon
B. Small Intestine
C. Liver
[✓ D. Bile Duct]

Q.26 Body cavity of round worms is called:

[✓ A. Pseudocoelom]
B. Acoelom
C. Coelom
D. Enteron

Q.27 *Trypanosoma* is transmitted in human beings by:

A. *Plasmodium*
B. House Fly
C. *Anopheles*
[✓ D. Tsetse Fly]

Q.28 Ascaris is:

A. Diploblastic
B. Haploid
[✓ C. Triploblastic]
D. Acoelomate

Q.29 During development, in an animal, mesoderm layer gives rise to:

A. Nervous System
[✓ B. Muscular and skeletal system]
C. Alimentary canal lining
D. Mouth

Q.30 *Fasciola* is the name given to:
A. Tapeworm
[✓ B. Liver fluke]
C. Planaria
D. Earthworm

Q.31 Polymorphism is characteristic feature of:
A. Porifera
B. Annelida
[✓ C. Cnidaria]
D. Nematodes

Q.32 Schistosoma is a parasite that lives in the _____ of the host.
A. Intestine
B. Liver
C. Kidney
[✓ D. Blood]

Q.33 Sleeping sickness in humans is caused by:
[✓ A. *Trypanosoma*]
B. *Anopheles*
C. *Plasmodium*
D. *Andes*

Q.34 The cavity between body wall and alimentary canal is:
[✓ A. Coelom]
B. Endoderm
C. Mesoderm
D. Mesoglea

Q.35 The layer which forms the lining of digestive tract and glands of digestive system is:
A. Ectoderm
[✓ B. Endoderm]
C. Mesoderm
D. Mesoglea

Q.36 Excretory system in platyhelminthes is in the form of:
[✓ A. Flame cells]
B. Metanephridium
C. Malpighian tubules
D. Kidneys

Q.37 The internal opening of nephridia is called:
A. Nephridiopor
[✓ B. Nephrostome]
C. Metanephridia
D. Nephropore

Q.38 Amphibians are evolved from:
A. Cartilaginous fishes
B. Reptiles
[✓ C. Dipnoi]
D. Cyclostomata

Q.39 Amnion is not present around the embryo of:
A. Reptiles
[✓ B. Amphibian]
C. Birds
D. Mammals

Q.40 In ______ both ovaries and oviducts are functionaB.
A. Robin
B. Kestrel
[✓ C. Eagle]
D. Kingfisher

Q.41 *Archaeopteryx is* connecting link between:
A. Reptiles & mammals
[✓ B. Reptiles & birds]
C. Birds & mammals
D. amphibian and fishes

Q.42 Scales are totally absent in:
A. Birds
[✓ B. Toad]
C. Lizard
D. Eagle

Q.43 A very beautiful, delicate, siliceous sponge appear to be made of glass framework is:
A. Sycon
B. Spongilla
C. Leucoselenia
[✓ D. Euplectella]

Q.44 In some coelenterates there are special feeding Zooids which are called _______ which perform only the function of nutrition for the whole colony:
A. Gonozoids
[✓ B. Gastrozoids]
C. Astrozoids
D. Medusazoids

Q.45 __________ **are fast moving coelenterate:**

A. Hydra
B. Physalia
C. Obelia
[✓ D. Jelly fish]

Q.46 **Ascaris is the endoparasite of:**

[✓ A. Small intestine]
B. Large intestine
C. Rectum
D. Appendix

Q.47 **One of the reason for the success of phylum arthropoda is its:**

A. Large variety of organism
B. Malpighian tubules
[✓ C. Chitinous exoskeleton]
D. Spiracles

Q.48 **Pigment cells called chromatophores present in:**

A. Reptiles
[✓ B. Amphibian]
C. Chondrichthyes
D. Mammals

Q.49 **The mammal-like reptile that was found as fossil in Texas:**

A. *Archaeopteryx*
B. *Duck bill platypus*
[✓ C. *Varanope*]
D. *Opossum*

Q.50 **The most important function of suckers is:**

A. Absorption of blood
[✓ B. Attachment]
C. Ingestion of food
D. Excretion of waste

Q.51 ***Fasciola hepatica*** **complete life cycle in** ________**host:**

A. 1
B. 3
[✓ C. 2]
D. 4

Q.52 **All are the hosts of tape worm except:**

A. Pig
B. Cattle
[✓ C. Snail]
D. Human

Q.53 **The animals of phylum are known as schizocoelous:**

[✓ A. Arthropoda]
B. Echinodermata
C. Porifera
D. Chordata

Q.54 **The circular rings called annuli are present on each segment of:**

A. Earthworm
[✓ B. Leech]
C. Tapeworm
D. Neries

Q.55 **The sense organ are in the form of sensory papillae present on the lips at the anterior end in:**

A. Flatworm
B. Nereis
[✓ C. Round worm]
D. Stylaria

Q.56 **Everything is true about coelom except:**

A. Found between body wall and gut
B. Fluid filled
C. Lined by mesoderm
[✓ D. Bound internally by cuticle of intestine]

Q.57 **All of the following have no swim bladder except:**

[✓ A. Cyclostomes] B. Chondrichthyes

C. Osteichthyes D. Amphibians

Q.58 **Pick out different considering habitat:**

[✓ A. Liver fluke] B. Hook worm

C. Pin worm D. *Ascaris*

Q.59 **Common housefly may be a cause of:**

A. Polio [✓ B. Hepatitis]

C. Tuberculosis D. Malaria

Q.60 **______ is a common feature of all mammals.**

A. Viviparous B. Have placenta

C. Right aortic arch [✓ D. Mammary glands present]

ANSWER KEY

1	D	11	B	21	A	31	C	41	B	51	C
2	D	12	C	22	D	32	D	42	B	52	C
3	B	13	C	23	C	33	A	43	D	53	A
4	D	14	C	24	C	34	A	44	B	54	B
5	D	15	A	25	D	35	B	45	D	55	C
6	A	16	C	26	A	36	A	46	A	56	D
7	A	17	A	27	D	37	B	47	C	57	A
8	C	18	A	28	C	38	C	48	B	58	A
9	C	19	C	29	B	39	B	49	C	59	B
10	A	20	D	30	B	40	C	50	B	60	D

10 UNIT

VARIATIONS & GENETICS/INHERITANCE EVOLUTION

SELF ASSESSMENT TEST

Q.1 **All the alleles present in the gametes of a sexually reproducing population are known as the population's:**

A. Gene frequency
B. Genome
[✓ C. Gene pool]
D. Genotype

Q.2 **An interaction between two alleles having single locus for a single trait can be labeled as:**

A. Pleiotropy
[✓ B. Dominance]
C. Epistasis
D. Polygene

Q.3 **Majority of hemophilic patients suffer from deficiency of:**

A. Factor VII
B. Factor IX
[✓ C. Factor VIII]
D. Factor XI

Q.4 **It is an example of chromosomal aberration:**

A. Sickle cell anemia
[✓ B. Jacob's syndrome]
C. Phenylketonuria
D. Alkaptonuria

Q.5 **XXY in humans is a:**

[✓ A. Sterile male]
B. Fertile male
C. Sterile female
D. Fertile female

Q.6 **Alleles in an individual for a particular trait are called its:**

A. Phenotype
B. Gene pool
[✓ C. Genotype]
D. Karyotype

Q.7 **Keeping in view the Mendel's law of Segregation, if tall plants were crossed with short heighted plants, then which of the following best describe the F_1 Progeny?**

A. Homozygous and tall heighted
[✓ B. Heterozygous and tall heighted]
C. Homozygous and short heighted
D. Heterozygous and short heighted

Q.8 **Which one might be the blood group of an individual with the following genetic makeup:"L^ML^N, I^Ai, Dd, hh"**

[✓ A. Phenotypically MN, O and positive]
B. Phenotypically MN, A and negative
C. Phenotypically MN, A and positive
D. Phenotypically MN, O and negative

Q.9 **Hemophilia is a sex linked _____ trait.**

[✓ A. Recessive]
C. Dominant
B. Codominant
D. Pleiotropic

Q.10 **All altered alternative forms of a gene, whose number is more than two are called:**

A. Co dominant alleles
B. Jumping genes
[✓ C. Multiple alleles]
D. Homozygous

Q.11 **The contrasting pair of trait in Mendelian crosses are called:**

[✓ A. Factor]
B. Paramorphos
C. Fixed gene
D. Allolocus

Q.12 **How many contrasting traits of pea were studied by Mandel?**

A. 2
[✓ B. 7]
C. 4
D. 3

Q.13 **The haploid chromosome number in pea is:**

A. 8
B. 10
[✓ C. 7]
D. 14

Q.14 When a tall pea plant (TT) is crossed with a dwarf plant (tt), what will be the F2 generation?
A. All tall plants
[✓ B. 3 tall 1 dwarf]
C. All dwarf plants
D. 3 dwarf 1 tall

Q.15 A test cross distinguishes between:
A. 2 homozygous forms
B. Homozygous recessive and heterozygous form
C.2 heterozygous forms
[✓ D. A homozygous dominant and heterozygous form]

Q.16 How many autosomes are present in a human egg?
[✓ A. 44]
B. 22
C. 23
D. 46

Q.17 Most prevalent abnormality of blood clotting factor is of:
A. VII
B. IX
[✓ C. VIII]
D. X

Q.18 A girl has blood group A and her brother has blood group B. Which combination of genotypes cannot belong to their parents:

	Mother	Father
A.	I^Ai	I^Bi
B.	I^AI^B	I^AI^B
C.	ii	I^AI^B
[✓ D.]	ii	I^Ai^O

Q.19 Genes don't settle at one place:
A. Running genes
[✓ B. Jumping genes]
C. Random genes
D. All of these

Q.20 The basic unit of biological information is:
[✓ A. Gene]
B. Locus
C. Chromosome
D. Allele

Q.21 The form of appearance of a trait is called:
A. Locus
B. Genotype
[✓ C. Phenotype]
D. Both a and b

Q.22 A true breeding variety upon self-fertilization always produces:
A. Only dominant offspring
B. Only recessive offspring
C. Both with ratio 3:1
[✓ D. Offspring identical to the parents]

Q.23 Gene linkage is:
[✓ A. Physical relation of genes]
B. Physiological relation
C. Both of these
D. None of these

Q.24 Which of the following trait is not X linked?
A. Colour blindness
B. Diabetes insipidus
C. Haemophilia
[✓ D. Leukemia]

Q.25 In Drosophila male determining genes are located on:
A. X chromosome
B. Y chromosome
[✓ C. Autosomes chromosomes]
D. Both on X and Y chromosomes

Q.26 With reference to sex chromosome *Drosophila* males are:
A. Homozygous
B. Heterozygous
C. Semizygous
[✓ D. Hemizygous]

Q.27 Which one of the traits zigzags from maternal grandfather through a carrier daughter to a grandson?
A. Autosomal
[✓ B. X-linked recessive]
C.Y-linked dominant
D. X-linked dominant

Q.28 A male having blood group AB and a female having blood group O are heterozygous carriers of recessive h-allele. The probability of a blood group O child would be:
A. 0%
B. 50%
[✓ C.25%]
D. 75%

Q.29 What are the chances of a hemophilic son, whose mother is a carrier but father is normal?
A. 0%
B. 75%
C.25%
[✓ D. 50%]

Q.30 Trait which passes directly from father to son:
A. Colour blindness
[✓ B. Maleness]
C. Ichthyosis
D. Hemophilia

Q.31 Origin of life is explained by all except:
[✓ A. Endosymbiont hypothesis]
B. Creationism
C. Hydrothermal vent hypothesis
D. Chemical evolution

Q.32 Scientist who first time presented concept of evolution with evidences:
A. Aristotle
B. Lamarck
C. Linnaeus
[✓ D. Darwin]

Q.33 Darwin believed in perceived unity of life. It means:
A. All organisms are unicellular
[✓ B. All organisms have common ancestor]
C. All organisms are similar
D. All organisms have common cells

Q.34 In different species, analogous organs evolve to adapt:
[✓ A. Same habitat]
B. Same nutrition
C. Different habitat
D. Different ecosystem

Q.35 Which of the following is not a vestigial organ in human body?
A. Wisdom teeth
B. Ear muscle
C. Appendix
[✓ D. Sacrum]

Q.36 According to Lamarck, evolution is cumulative product of:
[✓ A. Somatic changes]
B. Heritable variations
C. Genetic changes
D. Natural selection

Q.37 It is geographical distribution of species:
A. Zoogeography
B. Geology
[✓ C. Biogeography]
D. Paleontology

Q.38 The one who believed in theory of special creation is:
[✓ A. C. Linnaeus]
B. Mendel
C. Lamarck
D. Lyell

Q.39 The founder of "inheritance of acquired characters" theory was:
A. Hugo de Vries
[✓ B. Lamarck]
C. Weismann
D. Darwin

Q.40 Products of gene are:
[✓ A. Proteins]
B. Lipids
C. Carbohydrates
D. Vitamins

Q.41 The present giraffe has a long neck as compared to its ancestors. Darwin believed it could be due to:
[✓ A. Natural selection] B. Isolation
C. Inheritance of acquired characters D. Migration

Q.42 For evolutionary success, mutations must occur in:
A. Somatic RNA B. Somatic DNA
[✓ C. Germ cell DNA] D. Germplasm RNA

Q.43 Which of the following concept is attributed to Charles Darwin?
A. Use and disuse of organs is of great importance in evolution
B. Every cell must come from a pre-existing cell
[✓ C. In the struggle for existence, the fittest would survive]
D. The gametes will carry only one of a pair of contrasting characters.

Q.44 The animal species on the Galapagos resemble species living on the:
A. North American mainland B. Great Britain
[✓ C. South American mainland] D. Northern Europe

Q.45 Production of more individuals than the environment can support leads to:
[✓ A. Struggle for existence] B. Natural selection
C. Migration D. Evolution

Q.46 The tissues of the organisms are petrified by:
A. Silica B. Calcium phosphate
C. Calcium carbonate [✓ D. Both A and B]

Q.47 In which rocks most fossils are found?
A. Metamorphic [✓ B. Sedimentary]
C. Igneous D. All A, B, C

Q.48 Which of the following are not the example of analogous structure:
A. Wings of bats and butterfly B. Thorn and spine
[✓ C. Wings of bats and forelimb of cattle] D. Wings of bats and sparrow

Q.49 There are _____ number of linkage group in human.
A. 22 [✓ B. 23]
C. 80 D. 80

Q.50 Product of evolution is:
A. Ecosystem [✓ B. Species]
C. Community D. Biome

Q.51 In Vortex method, tiny holes in cell membrane are produced by:
A. Electric current [✓ B. Silicon carbide]
C. Particle gun D. Cesium chloride

Q.52 According to Darwin, finches found on Galapagos island had distinct characteristics due to:
[✓ A. Geographical isolation] B. Special creation
C. Developmental anomaly D. Inheritance of acquired characteristics

Q.53 Neo Darwinism is the result of reconciliation of Darwin's theory with:
A. Lamarck's work B. Lyell's work
C. Cuvier's work [✓ D. Mendel's work]

Q.54 Which of the following branch first suggested the idea of evolution to Darwin?
A. Zoogeography B. Phytogeography
[✓ C. Biogeography] D. Geography

Q.55 **Which of the following animal lives only in America?**
A. Kangaroo
B. White rat
[✓ C. Armadillos]
D. American python

Q.56 **Oldest fossils are of:**
[✓ A. Bacteria]
B. Dinosaur
C. Horse
D. Fishes

Q.57 **Similarity between the forelimbs of cats, whales, bats and other mammals show that they are:**
[✓ A. Monophyletic]
B. Polyphyletic
C. Paraphyletic
D. Diphyletic

Q.58 **Which of the following is not the vestigial structure?**
[✓ A. Ear of humans]
B. Goose bumps
C. 3rd molar of humans
D. Vermiform appendix

Q.59 **Which of following structure is common in all vertebrates at embryonic stages?**
[✓ A. Gill pouches]
B. 4 chambered heart
C. Teeth
D. Gills

Q.60 **Evolutionary relationship among specie is reflected at molecular level in their:**
[✓ A. DNA and protein]
B. DNA and carbohydrates
C. DNA and lipids
D. DNA and RNA

ANSWER KEY

1	C	11	A	21	C	31	A	41	A	51	B
2	B	12	B	22	D	32	D	42	C	52	A
3	C	13	C	23	A	33	B	43	C	53	D
4	B	14	B	24	D	34	A	44	C	54	C
5	A	15	D	25	C	35	D	45	A	55	C
6	C	16	A	26	D	36	A	46	D	56	A
7	B	17	C	27	B	37	C	47	B	57	A
8	A	18	D	28	C	38	A	48	C	58	A
9	A	19	B	29	D	39	B	49	B	59	A
10	C	20	A	30	B	40	A	50	B	60	A

POST-PREP TEST »

Q.1 **Detoxification of the drugs is a function of ____________ in a cell.**
A. R.E.R
B. Liver cells
[✓ C. S.E.R]
D. Lysosome

Q.2 **Which of the following way of transport is due to kinetic energy of substances across a membrane?**
[✓ A. Passive transport]
B. Active transport
C. Endocytosis
D. Exocytosis

Q.3 **All of the following are double membrane bounded structures except:**
A. Nucleus
B. Mitochondria
[✓ C. Golgi vesicle]
D. Chloroplasts

Q.4 **Synthesis and transport of proteins is carried out by:**
A. S.E.R
B. Golgi complex
[✓ C. R.E.R]
D. Lysosomes

Q.5 **The nature of the plasma membrane is**
A. Glycoprotein
[✓ B. Lipoprotein]
C. Glycolipids
D. Nucleoprotein

Q.6 **In Golgi apparatus, cisternae are thought to be moving from ____ to _______ face**
A. Inner, outer
B. Medial, lateral
C. Concave, convex
[✓ D. Convex, concave]

Q.7. **The most abundant organic molecule on the planet earth is:**
A. Starch
B. Glucose
C. Glycogen
[✓ D. Cellulose]

Q.8 **____________ is the precursor of steroid hormones.**
[✓ A. Cholesterol]
B. Glycerol
C. Fatty acids
D. Glycol

Q.9 The active site of an enzyme is formed by a few of the enzyme's:
[✓ A. R-groups of amino acids]
B. - COOH groups of amino acids
C. - NH_2 groups of amino acids
D. Exposed disulphide bonds

Q.10 **____________ bond is a potential source of chemical energy.**
[✓ A. C—H]
B. C—N
C. C—C
D. C = O

Q.11 **The molecule used by most of the animals for long-term energy storage is:**
[✓ A. Glycogen]
B. Fat
C. Starch
D. Cholesterol

Q.12 **Which of these types of carbohydrates are rare in nature?**
A. Monosaccharides
[✓ B. Tetroses]
C. Polysaccharides
D. Pentoses

Q.13 **Cellulase is cellulose digesting enzyme secreted by certain**
A. Herbivores
B. Animals
[✓ C. Bacteria]
D. Plants

Q.14 **Ribonuclease is a:**
[✓ A. Protein]
B. Nucleic acid
C. Carbohydrate
D. Lipid

Q.15 Which of the following forms a part of a co-enzyme?
A. Zn^{++}
[✓ B. Niacin]
C. Lipase
D. Lysine

Q.16 Energy must be added for chemical reaction to start. This energy is known as the energy of________________.
A. Entropy
B. Enthalpy
[✓ C. Activation]
D. Oxidation

Q.17 Amylase helps in the digestion of:
A. Maltose
B. Cellulose
[✓ C. Glycogen]
D. Protein

Q.18 Glycolysis and fermentation take place in the:
A. Mitochondria and cytoplasm respectively
B. Mitochondria
C. Cytoplasm and mitochondria respectively
[✓ D. Cytoplasm]

Q.19 Photophosphorylation occurs in:
[✓ A. Chloroplast]
B. Ribosome
C. Mitochondria
D. Both A and B

Q.20 Which is not required for Tricarboxylic acid cycle?
A. NAD^+
B. FAD^+
[✓ C. $NADPH_2$]
D. GDP

Q.21 CO_2 fixation occurs at/in:
A. Thylakoid
B. F_1-particles
C. Matrix
[✓ D. Stroma]

Q.22 Why is RuBP important in the process of photosynthesis?
[✓ A. It is an acceptor molecule for CO_2]
B. It is an acceptor for H^+
C. It is a source of H^+ ions
D. It is an intermediate in sucrose formation

Q.23 A bacterial cell swells and bursts during the lytic cycle because it:
A. No longer can synthesize proteins
B. No longer has intact chromosome
[✓ C. No longer has an intact cell wall to counter osmosis]
D. Has greater osmotic pressure due to catabolism of glycogen

Q.24 Which type of parasite a bacteriophage is?
[✓ A. Obligate intracellular parasite]
B. Inter cellular parasite
C. Facultative parasite
D. Cellular parasite

Q.25 Lysozyme is used to dissolve:
A. Viral capsid
B. Bacterial cell membrane
[✓ C. Bacterial cell wall]
D. Bacterial envelope

Q.26 Bacterial chromosome is composed of:
[✓ A. DNA only]
B. Proteins only
C. DNA and histone
D. RNA and histone

Q.27 Which of the following bacteria are without cell wall?
[✓ A. *Mycoplasma*]
B. Gram negative bacteria
C. Gram positive bacteria
D. Archaeobacteria

Q.28 Which one of the following is similarity of fungi with animals?
[✓ A. Presence of chitin]
B. Presence of centrioles
C. Nuclear mitosis
D. Absence of cell wall

Q.29 Pick the correct statement about all protists:
A. Unicellular
B. Multicellular
C. Autotrophs
[✓ D. Eukaryotes]

Q.30 Gall bladder is involved in
A. Synthesis of bile
[✓ B. Concentration of bile]
C. Digestion of carbohydrates
D. Haemostasis

Q.31 Maximum absorption of food occurs in
A. Buccal cavity
B. duodenum
C. Jejunum
[✓ D. Ileum]

Q.32 The opening of larynx is called
A. Epiglottis
B. Trachea
[✓ C. Glottis]
D. Periglottis

Q.33 Cartilages are completely absent in
A. Bronchi
B. Trachea
C. Wind pipe
[✓ D. Bronchioles]

Q.34 The chemical nature of surfactant is
A. Glycoprotein
B. Lipopolysaccharides
C. Pure protein
[✓ D. Lipoprotein]

Q.35 In proterostomia and deuterostomia respectively, cleavage is:
A. Indeterminate and spiral
B. Radial and spiral
[✓ C. Determinate and indeterminate]
D. Determinate and spiral

Q.36 T-lymphocytes are matured in thymus glands. They are produced in:
[✓ A. Thymus glands]
B. Pancreases
C. Bone marrow
D. Heart

Q.37 The chemical nature of antibody is:
[✓ A. Glycoproteins]
B. Lipoproteins
C. Glycolipids
D. Polysaccharides

Q.38 The erythrocytes burst when placed in ____________ solution.
[✓ A. Hypotonic solution]
B. Isotonic solution
C. Hypertonic solution
D. None of these

Q.39 Vaccination can produce ____________ immunity in our body.
A. Naturally induced active
[✓ B. Artificially induced active]
C. Naturally induced passive
D. Artificially induced passive

Q.40 The regions of an antibody that make it distinct from all other kinds of antibodies are its:
[✓ A. Variable regions]
B. Mutated regions
C. Constant regions
D. Bifurcated regions

Q.41 Lymphocytes that activate B-cells to divide are:
A. Activator B-cells
[✓ B. Helper T cells]
C. Cytotoxic T-Cells
D. Macrophages

Q.42 Flow of lymph is maintained by all factors except
A. Muscle contraction
B. Movement of viscera
[✓ C. Lymph nodes]
D. Valves

Q.43 Immune system makes which line of defense system in humans?
A. 1st line
B. 2nd line
[✓ C. 3rd line]
D. 4th line

Q.44 Body temperature is basically under control of the:
A. Cerebrum
B. Pons
C. Cerebellum
[✓ D. Hypothalamus]

Q.45 The All-or-None principle of the muscle contraction of muscle fiber refers to a maximum contraction: or no contraction of:
A. Muscle
B. Muscle fibre
C. Muscle bundle
[✓ D. Muscle fibrils]

Q.46 The ion that must be present for the binding of cross bridges is ______ ions.
[✓ A. Ca^{++}]
B. Fe^{++}
C. Na^{+}
D. K^{+}

Q.47 Skeletal muscles are derived from
A. Ectoderm
B. Endoderm
[✓ C. Mesoderm]
D. Epiderm

Q.48 The hormones in the human body are produced by:
A. Brain
B. Pancreas
C. Liver
[✓ D. Endocrine glands]

Q.49 Oxytocin hormone is released from the:
A. Adenohypophysis
B. Hypophysis cerebri
[✓ C. Neurohypophysis]
D. Anterior lobe of pituitary gland

Q.50 The major constituent of contraceptive pills is:
A. Estrogen
B. Prolactin
[✓ C. Progesterone]
D. Testosterone

Q.51 A receptor may be:
A. A nerve ending
B. An organ
C. A cell
[✓ D. All A, B, C]

Q.52 The effectors in the human body which respond to a stimulus are:
A. Glands only
[✓ B. Both muscles and glands]
C. Muscles only
D. Bones

Q.53 Menstruation is triggered by an abrupt decline in the levels of:
A. Estrogen
B. FSH
[✓ C. Progesterone]
D. LH

Q.54 The fertilization of ovum takes place in the proximal part of the:
A. Uterus
B. Placenta
[✓ C. Oviduct]
D. Vagina

Q.55 Type of STD in which causative agent attacks on immune system cells is:
A. Gonorrhea
[✓ B. AIDS]
C. Herpes simplex
D. Syphilis

Q.56 ______ are commonly referred as sex linked traits.
[✓ A. X-linked traits]
B. Y-linked traits
C. Sex influenced traits
D. Sex limited traits

Q.57 Which of the following traits pass in zig zag fashion from parents to offsprings?
[✓ A. X-linked traits]
B. Y-linked traits
C. Sex influenced traits
D. Sex limited traits

Q.58 Haemophilia can be result of
A. Reduction of blood clotting factors
B. Malfunctioning of blood clotting factors
C. Complete absence of blood clotting factors
[✓ D. All A, B, C]

Q.59 How many peptide bonds are present in an insulin molecule?
A. 50
B. 48
[✓ C. 49]
D. 51

Q.60 **If a carrier woman for haemophila is married to a normal man, then all of the following combinations can exist except**

A. X^HX^H B. X^hY

C. X^HY [✓ D. X^hX^h]

Q.61 **____________ are more common in human males than females.**

A. X-linked dominant traits B. Y-linked dominant traits

[✓ C. X-linked recessive traits] D. Autosmal linked recessive traits

Q.62 **How many chromosomes are present in an onion cell?**

A. 14 B. 18

[✓ C. 16] D. 26

Q.63 **Progesterone is secreted by:**

[✓ A. Corpus luteum] B. Ripening follicles

C. Uterine epithelium D. Fertilized egg

Q.64 **All enzymes are ______.**

A. Fibrous proteins B. Lipoproteins

C. Low molecular weight protein [✓ D. Globular Proteins]

Q.65 **Cardiac Cycle lasts about:**

[✓ A. 0.8 sec] B. 0.1 sec

C. 0.4 sec D. 0.5 sec

Q.66 **The wings of a bird and the fore–legs of a horse are ________ structures.**

A. Analogous B. Vestigial

[✓ C. Homologous] D. Evolutionary convergent

Q.67 **The first simplest oxygen producing organism:**

A. Methanogens B. Euglena

[✓ C. Cyanobacteria] D. Spirogyra

Q.68 **Ear muscles in man and goat are examples of**

A. Divergent evolution [✓ B. Convergent evolution]

C. Line evolution D. Web evolution

ANSWER KEY

1	C	11	A	21	D	31	D	41	B	51	D	61	C
2	A	12	B	22	A	32	C	42	C	52	B	62	C
3	C	13	C	23	C	33	D	43	C	53	C	63	A
4	C	14	A	24	A	34	D	44	D	54	C	64	D
5	B	15	B	25	C	35	C	45	D	55	B	65	A
6	D	16	C	26	A	36	A	46	A	56	A	66	C
7	D	17	C	27	A	37	A	47	C	57	A	67	C
8	A	18	D	28	A	38	A	48	D	58	D	68	B
9	A	19	A	29	D	39	B	49	C	59	C		
10	A	20	C	30	B	40	A	50	C	60	D		